# AUDIO VISUAL COMMUNICATION REVIEW


*William H. Allen* — Research on Film Use: Student Participation

*James D. Finn* — Automation and Education Part II

*Robert M. Sekerak* — Mass Communication Media, Reading Comprehension, and Intelligence

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Film

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# AUDIO-VISUAL COMMUNICATION REVIEW


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# RESEARCH ON FILM USE: STUDENT PARTICIPATION

• WILLIAM H. ALLEN

*This is the second in a series of reviews of research on the utilization of films in the classroom. The first report appeared in the Summer 1955 issue of this journal and was entitled "Research on Film Use: Class Preparation." William H. Allen is an associate social scientist in the System Development Division, The RAND Corporation, Santa Monica, California.*

DURING the past decade no single variable of film use has been studied as intensively as that of "participation." And no other variable has elicited such general confirmation as a means of facilitating learning from audio-visual communication materials.

Participation cannot be described as a single technic of film use. It is rather a name that has been attached to a group of technics, all having certain elements in common. The conditions for participation require that some kind of overt activity *consciously* be engaged in by the learner as he is exposed to the communication and that this activity be *systematically evoked* either by the communication itself or by some other person or device. Therefore, participation, as used in this sense, requires more than the kind of incidental audience involvement that might arise from identification or familiarity with the communication.

The number of these technics that might be devised is still unknown, but the following have already been investigated and will be considered in this discussion: recitation, "mental practice" (both overt and covert), rehearsal or practice, the knowledge of results, verbalization, discussion, and note-taking. Possibly some of these technics are but different names for the same psychological mechanism, but a clear-cut definition of each and its placement within the pattern of participation as such awaits further evidence and experimentation.

## CONTRIBUTIONS OF RESEARCH IN LEARNING

Different investigators account for the superiority of participation technics in various ways. Hoban and van Ormer (10:8-16) consider it to be one of several "audience involvement" factors, the others being identification, familiarity, subjective camera, anticipation, and dramatic structure and cartoon form. Hovland, Lumsdaine, and Sheffield (11:264-65) suggest that the factors of "direct rehearsal," "motivation," and "practice under stimulus conditions of the response subsequently to be performed" are the determining ones. Michael (19:39) concludes that the main factor in responding to discrete items of factual information is "practice"; but that where principles or methods are practiced there is "transfer" to non-practiced items, the transfer being in terms of generalization phenomena rather than in motivational terms. Roshal (23:10) supports the "practice of the response to be learned" position. Gibson (5:148) supports the principle of "overt response with reinforcement of right and wrong response."

It appears that much of the film research with the participation variable has been either made or interpreted within the conceptual framework of Clark Hull's theory of learning. An application of his principles of "stimulus generalization" and "response generalization" leads to Roshal's (23:4) hypothesis that "film-mediated perceptual-motor learning will be facilitated as the learning situation approaches an accurate representation of the learner himself actually performing the task or skill to be learned." If the learning situation is to be designed to approximate the performance of the response to be learned, actual practice of the response is required. Such practice is achieved by means of a participation technic.

Hovland, Lumsdaine, and Sheffield conclude that "The most obvious advantage of active participation is that it insures rehearsal of responses which are to be learned" (11:264). This rehearsal or practice calls into play the *law of exercise*, providing opportunities for experiencing the skill or association to be learned. Although this law of learning may be the dominant psychological mechanism operating in any participatory film-learning situation, McGeoch and Irion (18:224) point out that "instruction and set to learn are much more effective for learning than is the set merely to observe." This would indicate that repetition alone will not insure learning.

There is psychological evidence that the *law of readiness* may be

operating in the situation where there is participation. The act of participating in a communication may increase the motivation or "set" to learn or attend to it *as a whole*, not just to the material practiced. McGeoch and Irion (18:227-28) conclude on the basis of their review of motivation research that "an active set to learn, with its accompanying selective process and active response to the material practiced, is a powerful determiner of learning."

The *law of effect* will probably operate in those learning situations where "knowledge of results" or "feedback" is used. McGeoch and Irion (18:267-68) state that "when information of results is given, learning occurs and becomes more efficient over wide limits as the precision of the useful information increases. . . . The conclusion, derived from the general principles of learning, is that, for most efficient learning, knowledge of results should be administered as quickly and as specifically as possible."

Based upon studies of verbal materials, McGeoch and Irion (18:510) draw the following conclusions relative to the effectiveness of recitation during practice:

> (1) Recitation furnishes the subject with progressive knowledge of results. This information (a) acts as an incentive condition, (b) brings the law of effect directly to bear, (c) favors early elimination of wrong responses, and (d) by informing the subject which items have been learned, promotes a more effective distribution of effort over the material.
>
> (2) Recitation favors articulation of the items and leads to the utilization of accent and rhythm. (3) It likewise promotes grouping of the items, localization in the series, and the search for meaningful connections. (4) In recitation, the subject is practicing the material more nearly in the way in which it is to be tested and used—that is, without direct stimulation from the copy. It constitutes, therefore, a more immediately relevant form of practice.

It is clear, therefore, that the three principal laws of learning are operating in participatory learning situations. To what degree they are operating, with what kinds of communication material, and under what conditions of stimulation when audio-visual communications are used is the problem toward which the remainder of this paper will be devoted.

## REVIEW OF COMMUNICATION RESEARCH

The experimental studies conducted with films that employ participation technics as a variable of use are reviewed below. Because the actual technics used vary, the reviews will be organized into the following five categories: (a) verbalization of response,

(b) perceptual-motor responses, (c) knowledge of results, (d) mental practice, and (e) note-taking. Only the portions of these studies that compare the application of the particular participation technic with other participation technics or with other instructional technics will be discussed here.

*Verbalization of Response*

*Hall Study* (6). In an early study, Hall recognized the importance of participation. He varied a testing procedure for 74 general science high school students being shown three geology films in the following ways: (a) test announcement followed by film and then a test, (b) no test was announced or given, and (c) test announcement followed by film during which a slide containing the test questions was projected below the film throughout the showing, the students being instructed to write their answers as soon as they could. The same test was used as pre-test for all groups two days prior to the film showing, as part of the experimental variable for the first and third methods, and as a retention test for all groups two weeks after the film showing. Results indicated that the use of the test immediately following or during a film presentation produced significantly greater student learning when they were retested two weeks later. However, there were no significant differences in retention between the group that participated in the test during the showing and that which participated in the test immediately after.

*Hovland, Lumsdaine, and Sheffield Audience Participation Study* (11:228-46). A sound filmstrip on the teaching of the Signal Corps phonetic alphabet and pronunciation of numerals was shown to 16 groups of Army recruits totaling 742 men under four conditions of presentation: (a) a "standard" filmstrip in which review lists of each phonetic name with its corresponding letter were pronounced by the narrator; (b) a "participation" filmstrip in which these letters were followed by a question mark, the names to be pronounced by the audience; (c) the announcement of a test preceding the "standard" version; and (d) the same test announcement prior to the "participation" version. A sampling of men were given individual oral tests of their ability to recall the phonetic names, and the remainder of the men were given written tests. Figure 1 shows the results. Total results may be summarized as follows: (a) The men who had active participation recalled 68 percent of the

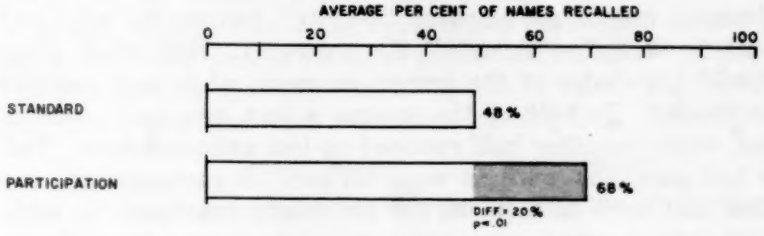


FIGURE 1

EFFECT OF PARTICIPATION ON NUMBER OF PHONETIC NAMES RECALLED

phonetic names within the 2 second recall time period, and those who had no participation recalled only 48 percent, a learning difference of 20 percent, significant at the 1 percent level. (b) When a comparison was made on the effects of participation between the easy and difficult phonetic symbols, it was found that the participation version was most effective with the difficult material, the difference being a highly reliable 20 percent. (c) Active participation was most effective when men were not motivated to learn by the announcement of a test, the difference being almost 13 percent, significant at the 4 percent level; but the announcement of a test produced almost as much learning as the use of participation technics alone. The two technics together raised the learning only an additional 5.2 percent. (d) Participation benefited the less intelligent men, being 16 percent (reliable at 5 percent level) superior. (e) Taking the conditions of difficulty of material, motivation to learn, and learning ability into account, active participation was most effective with the less intelligent, non-motivated men, learning the more difficult material (23 percent increase). Conversely, it was least effective with the more intelligent men learning easier words, regardless of motivation (3 percent increase).

*Michael Study* (19). This important study was designed to investigate the relative effectiveness of several conditions of participation and to continue the work on audience participation made by Hovland, Lumsdaine, and Sheffield in their "audience participation" study (11). The experiment was conducted with 640 high school juniors and seniors, using an edited version of "Pattern for Survival," a film on civil defense against the atom bomb, which was stopped periodically to permit the audience to answer questions on

the factual materials they had just viewed. Half of the eight experimental groups participated "overtly" (wrote the answers) and half "covertly" ("thought" the answers). Half were given "feedback" knowledge of the correct answers, while half received no "feedback." To half of the groups a test was announced in advance, while the other half received no test announcement. Half of the test questions were on material used in participation, and the other half were on material not previously practiced. In addition four control groups were used, varied to control the different factors studied. Immediately following the film, the experimental groups were tested on the factual material. No retention test was given. The results follow: (a) Figure 2 shows the overall gains produced by audience participation as compared with merely view-

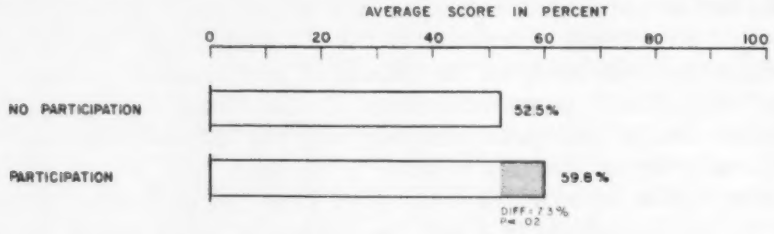


FIGURE 2

EFFECT OF PARTICIPATION ON FACTUAL INFORMATION SCORES

ing the film. The gain of 7.3 percent was significant at the two percent level, and confirms the Hovland, Lumsdaine, and Sheffield findings. (b) The significant superior effect of the participation technics, however, held only for those items *specifically practiced*, no difference being apparent between the two groups on non-practiced items. (c) The results on the "feedback" and mental practice variables will be reviewed below, and the effect of the test-announcement variable was discussed in an earlier paper (1), indicating that the test-announcement resulted in no significant learning. One of the most significant outcomes of this study was the finding that the increase in learning seemed to be due primarily to practice effects and not to effects of changes in motivation to learn.

*Kurtz and Hovland Study* (16). Although not a film study, this experiment dealt with the observation of objects. Sixteen familiar objects were presented to 72 elementary school children, half of the

group finding and circling on a sheet of *pictures* the appropriate object pointed to and the other half finding and circling on a sheet of *names* of the objects the appropriate one. This second group also pronounced each name aloud as the demonstrator pointed to it. The groups were tested for retention a week later. Figure 3 shows that the group that had verbalized at the time of presentation

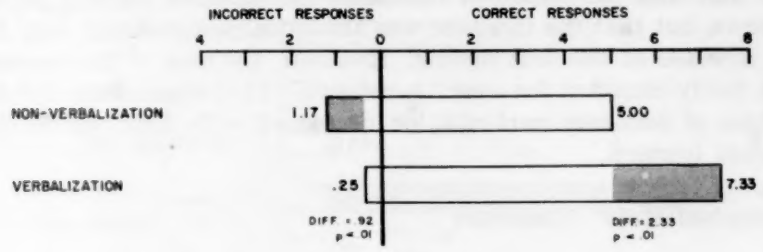


FIGURE 3

RECALL RESPONSES BY NON-VERBALIZATION AND VERBALIZATION GROUPS

recalled more items correctly and made fewer incorrect responses than the non-verbalization group.

*Slattery Study* (24). Slattery compared the effectiveness in teaching informational and conceptual social studies material to 422 fifth grade students, using three mthods of presentation: (a) sound motion pictures, (b) filmstrips with participation, and (c) filmstrips without participation. The participation was achieved by having the students *read aloud* the verbal content of the filmstrips. The procedure was to pre-test the students, present the film or filmstrip the next day, and immediately re-test them on the same test. No retention test was administered. Both filmstrips with and without participation were significantly superior to the motion picture, and the same results held for the various levels of intelligence. Although the filmstrips with participation were slightly superior to those without, the differences were not statistically significant.

*Kendler, Cook, and Kendler Study* (14). This study attempted to determine whether the effectiveness of repetition of review sections in a film could be increased by means of overt audience participation. The experimental film used was a military film on conventional map signs and consisted of an introductory section plus either one, two, or three consecutive presentations of a review.

The subjects were seven groups of four high school classes each. Three of the groups were instructed to call out the names of the map signs as they appeared in the review, and three groups were given no such instructions. The groups viewed either one, two, or three of the reviews. They were tested immediately after the film and again four weeks later. The results showed that the overt oral audience participation increased the amount learned on all reviews, but that the increase was statistically significant only for the increase on the first review. However, the size of the increase was fairly constant for every repetition. This superiority for the technic of audience participation decreased with time, as did the amount learned.

*Perceptual-Motor Responses*

*Roshal Study* (22). Eight experimental versions of a film were designed to teach 3314 naval recruits how to tie three knots, the films differing in the variables of camera angles, motion, inclusion of hands, and participation. The participation versions of the film required the learners to tie the knots simultaneously with the film demonstration. After the demonstration on each knot was presented, the film was stopped, and the men were tested by actually tieing the knot. The results showed no significant advantages for the participation technic, but Roshal attributed this result to the possibility that insufficient time was allowed during the film showings for effective participation.

*Jaspen Study* (12). Jaspen investigated further the suggestion made by Roshal's study that a slower rate of development in the film was needed to provide time for participation. Using films demonstrating the assembly of the breechblock of the 40 mm anti-aircraft gun with 1818 naval trainees, he tested audience participation in the assembly of the gun under the following experimental conditions: (a) a *slow* rate of development of the film *with* participation, (b) a *slow* rate *without* participation, (c) a *fast* rate of development *with* participation, and (d) a *fast* rate *without* participation. Figure 4 shows the results of the experiment. Audience participation was found to be a very effective procedure to use when the rate of development of the film was slow enough to permit participation. At the slow rate of development, participation was significantly superior to no participation; but at the fast rate of

development, participation had a negative effect upon the learning, being slightly inferior to the no-participation method.

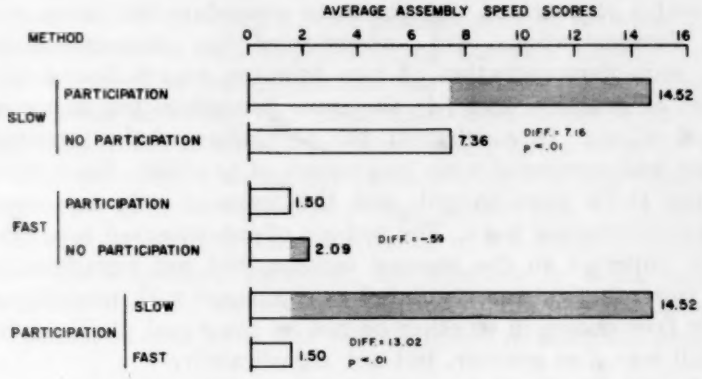


FIGURE 4

EFFECT OF PARTICIPATION ON ASSEMBLY OF BREECHBLOCK

*Ash and Jaspen Study* (3). Still further experimentation was made upon the effects of rate of development, repetition, and participation as employed under special conditions which used the rear projection of perceptual-motor films on the assembly of the breechblock of the 40 mm antiaircraft gun. About 1100 naval trainees took part in the experiment. Ash and Jaspen used the same films employed by Jaspen (12) and compared the effects of audience participation (concurrent practice) with films that varied in rate of development (fast vs. slow) and in the number of times the films were repeated (one, two or three). The data were analyzed separately for (a) a pass-fail score and (b) if he passed, a time score in seconds. The study confirmed the earlier findings of Jaspen (12) that audience participation was helpful with a film that had a slow rate of development and detrimental with a fast film. This positive contribution of the slow film to participation was even more greatly apparent in the speed score data. In the case of the relationship of participation to the number of times the films were repeated, no significant relationship was found in pass-fail scores. However, the speed scores showed a highly significant relationship between participation and the combination of one and two repetitions of the films.

*Harby Study on Interspersed Practice* (7). The effectiveness of using continuous film loops interspersed with practice and coach-

ing in teaching tumbling skills to four college physical education classes was studied. Four teaching procedures were used: (a) three *massed live* demonstrations of two minutes each, followed by six minutes of practice, (b) the same procedure but using massed *movie* demonstrations, (c) *interspersed live* demonstrations in which each demonstration of two minutes was followed by two minutes of practice, and (d) the same procedure but using *movie* demonstrations. In a substudy the *regulation* of the interspersed practice was compared with *free choice* of practice. Four different tumbling skills were taught, and the learning was measured by actual performance tests. The technic of interspersed practice was slightly superior to the massed technic, but not significantly so. When this practice was regulated as compared with permitting the learner free choice in whether or not he practiced, the learning of the skill was also greater, but not significantly.

*Murnin, VanderMeer, and Vris Study* (20). Using 263 students in basic electricity from two naval training schools, three methods of teaching principles of electricity were compared: (a) "regular" method by means of lecture and demonstration, (b) "wiring board" method, in which students practised exercises on a mockup of an electrical system, and (c) the "diagram" method in which the students practiced the exercises on paper drawings of the wiring board. The groups were tested by means of a paper and pencil test on their ability to solve electrical circuit problems, the theory of Ohm's law and the theory and use of D.C. electrical testing meters. Results showed that there were no significant differences among the three methods on the over-all learning. On the three subtests in the two schools, however, the "wiring board" method was superior to the "regular" method in one case (out of six), and the "diagram" was superior to the "wiring board" in one case and the "regular" method in two cases (out of six). If the "wiring board" and "diagram" methods can be considered to be applications of the participation principle, they can be said to be little more effective than non-participation. However, the superiority of both of these methods to the "regular" method in one school and of the "diagram" method to the "regular" method in the other school on the "meter" subtest (an area of more structured, restricted, and clearly defined content than either "theory" or "problems") may indicate that the nature of the content taught might have influenced the effects of the participation technics. It may also be true that participation was not the overriding variable in these experiments.

*Rimland Study* (22). A series of interrelated experiments investigated several ways of employing repetition in perceptual-motor films on knot-tieing. The participation variables studied were the effects of (a) inserting a brief practice session between the two film demonstrations and (b) practicing the skill *during* the film demonstration. The test population for the entire study consisted of 2680 naval recruits. The films used were those employed by Roshal (23) in his experiments; therefore, it is no surprise to discover that practice in tieing the knots during the film demonstrations resulted in no increased learning. In this case, the result may have been a function of the film itself, which allowed insufficient time for participation. However, the practice in tieing one knot between the first and second presentation of the film indicated that participation of this kind was not an effective teaching procedure either.

*Knowledge of Results*

*Gibson Study on "Differential Reinforcement in Aircraft Identification"* (5:145-49). This study was conducted with 280 aircraft trainees and investigated their ability to identify airplanes from slides, using two methods of presentation: (a) "unreinforced method," in which each of 20 slides of foreign planes was shown for 5 seconds, the name of the plane being announced just before it appeared on the screen and repeated while it was on the screen, the entire exhibition being made three times, and (b) "reinforced method," in which the first presentation was like the "unreinforced method," but on the second and third presentations the slides were exposed for only 2.5 seconds, after which the trainees identified each on a numbered answer sheet and then received the correct response, correcting their papers. The fourth presentation of the slides was

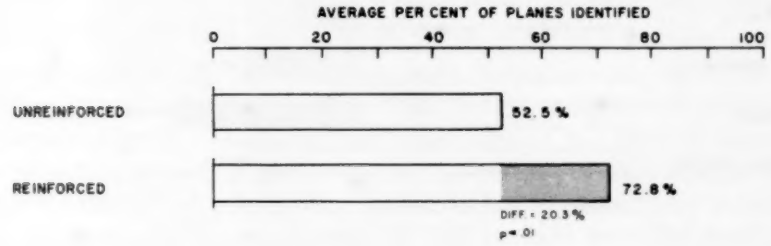


FIGURE 5
EFFECT OF REINFORCEMENT ON NUMBER OF PLANES IDENTIFIED

a recognition test. Figure 5 shows that the gains for the "reinforced method" were highly significant, this method increasing the learning by over 20 percent and resulting in almost 14 percent of the trainees getting all the slides correct (as contrasted with about 3 percent by the other method). Gibson concluded that, "The experiment showed clearly that the principle of *overt response with reinforcement,* the effectiveness of which had been demonstrated many times in learning studies, was applicable to the special form of visual learning required for the successful recognition of aircraft" (5:148).

*Yale Motion Picture Research Project Study* (27). This study investigated the effects upon 150 high school pupils of "motivation" and "participation" questions inserted into a film on the heart and circulatory system. Five methods of presentation were used: (a) factual presentation of the film without questions, shown once; (b) the factual version plus "motivating" questions in the form of printed titles preceding each unit of material in the film; (c) the factual version plus "participation" questions to be answered by the pupils on a worksheet after each unit, the correct answer then being presented on the screen; (d) the factual version supplemented by a combination of "motivation" and "participation" questions; and (e) the factual version, shown twice. A 40-item multiple-choice test measured the pupils' knowledge of the subject matter taught. This test was given a week before the film showing and again immediately after. Figure 6 shows that the "motivation" questions

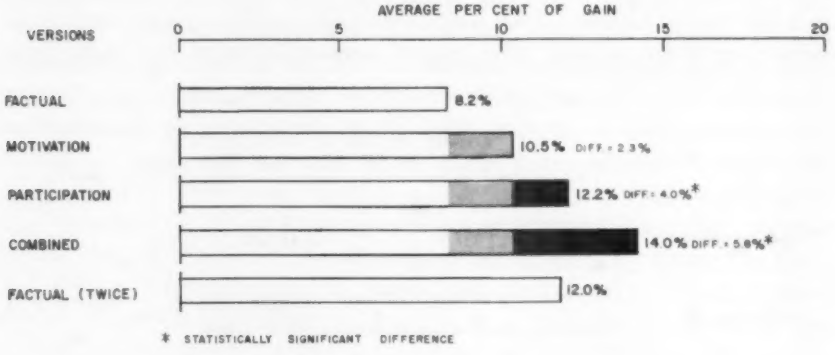


FIGURE 6

EFFECT OF MOTIVATION AND PARTICIPATION QUESTIONS WITH KNOWLEDGE OF CORRECT ANSWERS

made a slight contribution to the effectiveness of the film, but that the "participation" questions made a greater and significant contribution. When the two types of questions were combined, the "participation" questions, again, were shown to increase the learning significantly. When the learning from the participation version was compared with that from *two* showings of the factual version, it was found that a 54 percent increase in time required resulted in a 49 percent gain in correct answers, whereas the double-showing required a 100 percent increase in time and resulted in only a 46 percent gain. As might be expected, the major gain from including "participation" questions was on the test items directly covered by the questions (7.3 percent) as contrasted with those items not directly covered (1.2 percent).

*Kurtz, Walter, and Brenner Study* (15). This study compared six methods of teaching factual information to over 3000 tenth grade students, using two films, "The Care and Use of Hand Tools—Wrenches" and "Snakes." The six methods of presentation were: (a) original film, used as a control version, (b) the original film, shown *twice*, (c) a "persistent questions" version in which a number of multiple-choice questions were inserted, (d) a "persistent statements" version that had reinforcing statements inserted instead of questions, and (e) and (f) "medium questions" and "medium statement" versions in which only half as many questions or statements were inserted. The students were allowed 8 seconds to answer the questions on an answer sheet, and then the incorrect answers faded away from the screen leaving the correct answer. The commentator then also repeated the question and correct answer. The "statement" versions required no such participation. The results between the two films and for boys and girls separately were inconclusive and showed no consistent superiority of any one method. Generally, showing the film *twice* seemed to be about as effective as inserting either questions or statements.

*Michael Study* (19). As reported in the section on "Verbalization of Response" above, half of the groups studied in this experiment were given "feedback," or knowledge of the correct answers to questions asked. Figure 7 gives the results of this comparison. The "feedback" of results was the most sizable contributor to learning studied, gaining an average of 16.3 percent over the condition of "no-feedback." These differences held equally for both high and low intelligence groups. The author concludes, "It seems safe to

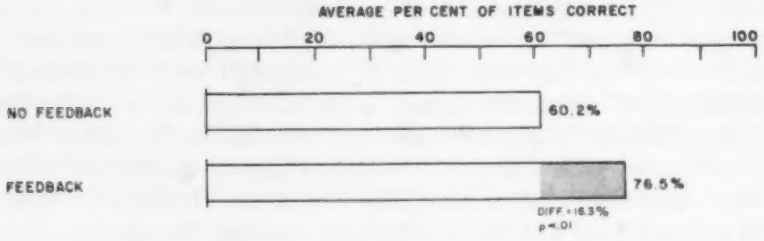


FIGURE 7

EFFECT OF "FEEDBACK" ON FACTUAL INFORMATION SCORES

propose that here is a highly general finding: the proposition that superior learning will occur when the learner is given the opportunity to rectify an error by knowing that an error has been made, what the error was, and what the correct behavior should be, has not only empirical support of this experiment but considerable support from various theories of learning and previous experimentation in other media as well as films" (19:30-40).

*Harby Study on Interspersed Practice* (7). In a substudy of the experiment reported above in the section on "Perceptual-Motor Responses," the effect of coaching during practice was measured. It was found that when the college students learning tumbling skills were coached during practice (either interspersed with the continuous film or on a free choice basis) significantly greater learning took place. This coaching consisted of the pointing out of errors to individual students by a skilled instructor.

*Hirsch Study* (9). Using the Classroom Communicator, a device developed by the Instructional Film Research Program at Pennsylvania State University to enable immediate and continuous communication between the instructor and any student in the class, the effect of knowledge of test results upon the learning of meaningful material was studied. Six technical naval training films were used with 138 midshipmen in the NROTC at Pennsylvania State University. The following six methods of presentation were compared: (a) no knowledge of results, (b) knowledge only that answer was "right" or "wrong" for each individual, (c) same as "(b)" plus the number of the correct answer for all students, (d) same as "(b)" plus the repetition on the screen of the questions with all alternatives removed but the correct one, (e) same as "(d)"

with addition of the second showing of the film, and (f) two showings of the film without knowledge of results. The knowledge of correct responses was *not* interspersed *during* the film showing, but was given during the immediate test following the film. The men were then retested three weeks later on a 120-item composite test. Figure 8 shows the differences between the post-test and immediate

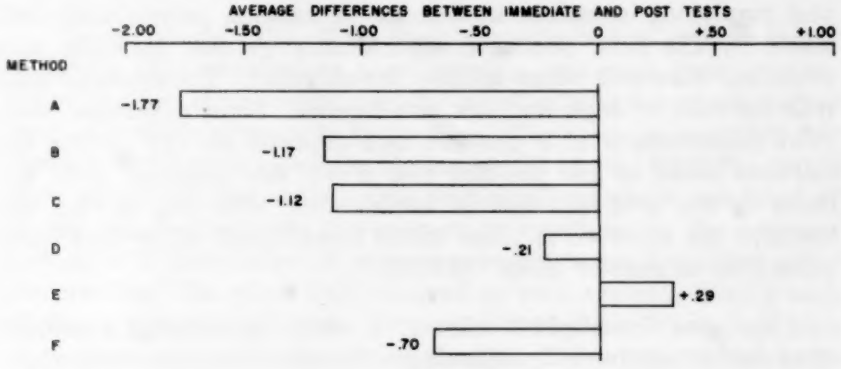


FIGURE 8
EFFECTS OF KNOWLEDGE OF RESULTS UPON RETENTION OF FACTUAL INFORMATION

test scores (delayed post-test minus immediate test). It will be seen that all methods were superior to the method that showed the film once with *no* knowledge of results. These differences were statistically significant. The method that followed knowledge of results with a second showing of the film "(e)" resulted in the greatest retention, but this method added considerably to the time used and the gain was *not* significantly greater than Method "(d)" in which the film was not reshown. In general, knowledge of test results was found to have a significant effect upon learning, particularly when the *entire question* and *answer* was provided. However, a *double-showing* of the film appeared to be *as effective* as knowledge of test results technics.

*Stein Study* (25). This study made an effort to discover whether a pre-film test with knowledge of results, followed by the showing of a film, would produce more learning of factual content than showing the film either once or twice without the test. Seventeen groups of about 100 seamen recruits each were shown the

films, *Weather* and *Measuring Instruments* under conditions which provided "complete," "partial," or "no" knowledge of test results. The tests were given prior to the film showing and varied by presenting the information in the same order as that in the film (compared with a scrambled order) and by being either "identical" with or "comparable" to the final post-film test items. It was found that a pre-film test, which had identical, sequentially-ordered items, and employing complete knowledge of results, immediately followed by the film, produced significantly greater learning and retention than any other method investigated. The findings held true for men of high and low intelligence. Stein concluded that, "The effectiveness of a pre-film test depends on (a) giving the learners items in the pre-film test which are identical with the items in the post-film test in combination with (b) giving the learners the answers to those items immediately after they have attempted to answer them" (25:13).

*Kale and Grosslight Studies* (13). Kale investigated a number of variables relative to the learning of Russian language vocabulary. He compared five methods of teaching lists of verbs and nouns, including the use of words only, still pictures, silent and sound motion pictures, and a sound motion picture with participation. This participation version contained a provision for the audience to repeat each Russian word aloud after the word had been presented by the narrator. The subjects were 409 men and women introductory psychology students at Pennsylvania State University. The presentational procedure deserves careful description as the method itself utilized a participation technic. The 20 word pairs (English-Russian) were shown in their entirety as titles only. Then the first English word was shown followed by a period of 10 seconds during which clear film ran through the projector enabling the subject to write the Russian equivalent. The subjects then turned over this page, and the English and Russian words appeared on the screen. This procedure was followed for all 20 words, and then the entire procedure was repeated *six* times. One week following the pre-test utilizing the technic outlined above, the subjects received one of the five experimental versions, following essentially the same procedure used in the pre-test, but with different words. The participation version, in which students *pronounced* Russian words, was found to inhibit significantly the learning of the ability to *write* the words. The author concludes that this finding was "not neces-

sarily in conflict with the accepted idea that participation usually aids learning because in this study the kind of participation studied had to do with the pronunciation of the words, and the subjects were not tested for this." The writing of Russian words was not a variable in the study, but it is important to note that all subjects "participated" in this sense, as this technic was part of the learning-testing procedure.

*Levine Study* (17). This study investigated in greater detail Michael's (19) conclusions that learning increases from participation during active review were the result of practice effects rather than an over-all increase in motivation. The subjects were 939 Air Force trainees who viewed a film on world maps. Half the group were shown the film with active participation, which consisted of having the groups write the answers to questions on the previous section with knowledge of correct answers being furnished after the practice. The other half received no such review. Within each of these groups half were presented under conditions of high motivation and half under low motivation. Ten of the 35 test questions were practiced during the review sessions. Results showed that as in previous experiments larger gains occurred on practiced than on non-practiced test items under conditions of both high and low motivation. However, significant gains occurred on non-practiced items in the active participation groups under conditions of low motivation, leading the author to conclude that "under conditions of low motivation active review procedures can result in gains due in part to motivation."

*Mental Practice*

*Harby Study on "Mental Practice"* (8). Harby compared "mental practice" with "physical practice" in teaching the shooting of the basketball free throw. The subjects were 250 college physical education men students. The population was divided into the following seven groups on the basis of a pre-test of 20 underhand basketball free throws: (a) control group, which took pre- and post-tests, but received no intervening instruction; (b) physical practice group, given a 1-minute demonstration by an instructor followed by 20 free throws per day for 20 days; (c) mental practice Group I, shown the film six times (15 minutes) per day for *seven* days, while subjects "mentally practiced" the skill, followed by post-test after seventh day; (d) mental practice Group II followed

same procedure, but for *fourteen* days; (e) mental practice Group III followed same procedure, but for *twenty* days; (f) mental *plus* physical practice Group I, shown film once each period followed by 20 free throws each day for 20 days; and (g) mental *plus* physical practice Group II, followed same procedure as mental practice groups for *fourteen* days, and then received *seven* days of instruction same as for physical practice groups. The film used was a 2.5-minute "loop" (the beginning spliced to the end) of film demonstrating the basketball free throw. It was projected on a rear-projection screen in subdued light in a room adjoining the main gymnasium. The results shown in Figure 9 indicate that the *twenty* periods of physical practice were significantly more effective than

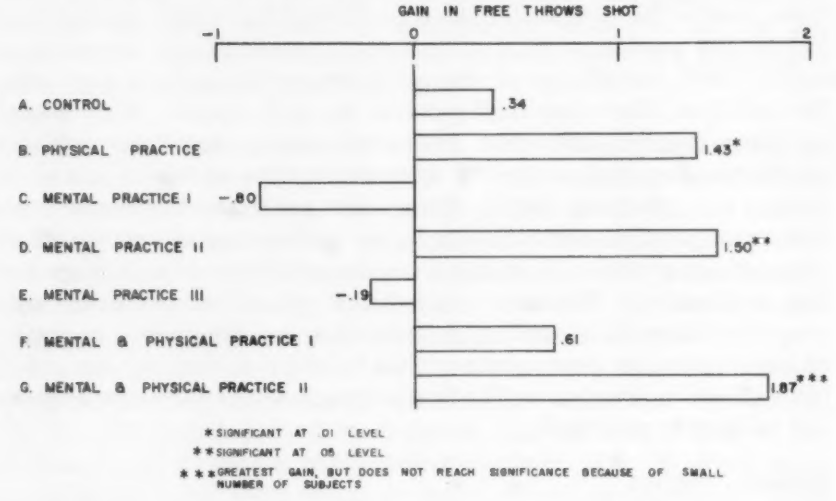


FIGURE 9
COMPARISON OF MENTAL AND PHYSICAL PRACTICE
ON BASKETBALL FREE THROW SKILL

*twenty* periods of mental practice, but were *not* significantly more effective than *fourteen* periods of mental practice. The group that mentally practiced for 14 periods and then physically practiced for an additional seven made the greatest gains in the skill, but the small number (eight) of students in this group prevented the gains from reaching a significant level of confidence. In general, the results present strong evidence of the efficacy of mental practice in teaching perceptual-motor skills.

*Michael Study* (19). As reported above in the section on "Verbalization of Response," one of the variables studied by Michael was that of mental practice. One group participated "overtly" by writing answers to questions that were asked as the film was stopped periodically. Another group participated "covertly"; that is, they "thought" the answers to the questions. When tested, the mental practice group was found to have learned the factual content of the film as well as did the group that wrote the answers.

*Patterson Study* (21). In an exploratory study, Patterson studied mental practice technics in teaching San Diego State College teacher education students how to thread and operate a Bell and Howell motion picture projector. One group was taught in the usual way, receiving three hours (three separate sessions) of individual laboratory instruction and practice on the projector. The other group received several showings of a film demonstrating the procedure, mentally practicing the steps during and between the showings, but never actually threading a projector. The results showed that the mental practice group learned to thread and operate the projector as well as the actual practice group as measured by a performance test. However, the actual practice group took a shorter time to perform this skill.

*Note-Taking*

*Vernon Study* (26). Vernon studied the use of a film and a filmstrip to teach British seamen to comprehend and learn facts about taking soundings with a lead line. The 774 seamen comprised 22 classes in all, and the effect of the instruction was measured by a written test. Two comparisons involving note-taking as a variable were studied: (a) filmstrip shown for *three* periods *with* note-taking and a showing of the film, and (b) filmstrip shown for *two* periods *without* note-taking and a showing of the film, but with *one* period of ordinary practical instruction on the skill. So it may be seen that this comparison was *not* between taking notes and not taking notes, but between spending an extra hour on note-taking during the filmstrip and spending that time on practical instruction. The results showed no difference between the two the note-taking procedure in aiding understanding as measured by comprehensive questions. The investigator concluded that note-methods in teaching memory for details, but a slight advantage to

taking did not appear worthwhile in teaching this skill and also pointed out that it was difficult to light the room for the note-taking.

*Ash and Carlton Study* (2). The effectiveness of note-taking was studied, using 216 freshmen college students as subjects and two Navy kinescope film recordings on "High Altitude Flying" and "Ocean Survival and Safety." The films were shown in a dimly-lighted room which had enough light to permit note-taking. The groups were tested with multiple-choice factual information tests. Three experimental methods and a control were employed: (a) Film Only, in which the film was shown without note-taking; (b) Film plus Notes, in which students took notes while seeing film; (c) Film plus Notes plus Review, in which students took notes while seeing film and then reviewed the notes for ten minutes after the showing; and (d) Control which took the test without seeing the film. The results in Figure 10 show that the Film Only group earned the highest mean percent score on each film, the results

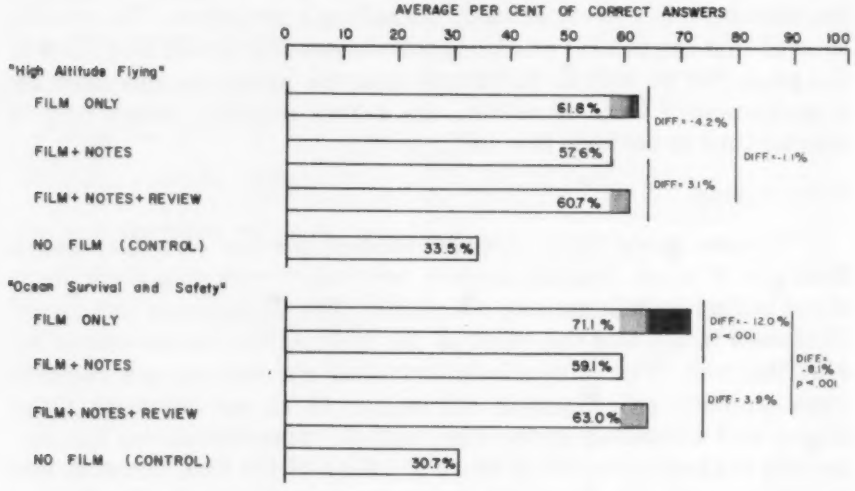


FIGURE 10

EFFECT OF NOTE-TAKING ON LEARNING DURING A FILM

being statistically significant at the .1 percent level on the "Ocean Survival and Safety" film. Although the extra 10 minutes devoted to review of the notes produced a slight increase in learning over the Film and Notes only group, this advantage was not a statistically significant one. The conclusion may be made, under the con-

ditions of this experiment, that note-taking actually *interfered* with learning. Although the review technic aided somewhat in the recall of the points written down, it did not compensate for the interference caused by taking notes.

## DISCUSSION OF RESULTS

### *Summary of the Findings*

Of the 26 comparisons in the studies summarized relating to the use of participation technics, 13 favored participation and only two favored nonparticipation. The remaining 11 comparisons showed participation to be at least equal in effectiveness.

As revealed by the results, "verbalization of response" and the furnishing of "knowledge of results" appeared to be the most effective participation technics. Only "note-taking" was shown to be of doubtful value.

*Verbalization of Response.* Of the six comparisons made using verbalization of response as a variable, five were shown to favor participation and one was inconclusive. Such an advantage would seem to point to this utilization technic as an important one in increasing learning from instructional films. On the basis of the studies made, the following kinds of verbalization appear to increase learning: (a) verbalizing the communication content during interspersed reviews, (b) answering questions during the film presentation, (c) describing action during a perceptual-motor activity, and (d) verbally describing the content during the presentation.

*Perceptual-Motor Responses.* Of the six comparisons made using participative technics during the learning of a perceptual-motor skill, two favored participation and four showed no advantage to either participation or non-participation. Therefore, the evidence is much less clear regarding the value of participation in learning motor skills. Two kinds of participation were used: *during* the actual film presentation and *interspersed* between repetitions of a demonstration film. The four comparisons that studied the effect of participation *during* the presentation of the film pointed up the fact that such participation contributed to the learning of the skill *if* the film was *slowly enough paced* to permit performance of the skill without distracting the viewer from the film content. The two studies that investigated the effect of *interspersed* practice showed participation of no significant value in increasing ability

to perform the skill when the film demonstration was presented two or more times.

*Knowledge of Results.* Of the nine comparisons made using knowledge of results as a variable, seven showed an advantage to this participation technic, one was inconclusive, and one found that knowledge of results interfered with learning. However, this last study used participation in the *pronunciation* of Russian words in order to teach the ability to *write* the words; so this could account for the results. It seems clear that the furnishing of knowledge of results during or after participation during the showing of a film is an important contributor to learning from that film. On the other hand, the two studies that compared the furnishing of knowledge of results with a *double-showing* of the film showed no advantage to either technic. It should be remembered, in interpreting these results, that the "knowledge of results" variable also used participation of other kinds during the film presentations and that these other variables may also have been operating.

*Mental Practice.* The three studies on mental practice strongly suggest that such technics may be highly effective learning devices under certain conditions. It is significant that two studies found "mental practice" technics to be as effective as actual overt physical practice in learning perceptual-motor skills, and that one study found "covert" verbalization to be as effective as "overt" participation. Although these few studies present rather dramatic evidence on this variable, additional research is needed.

*Note-Taking.* Two studies furnish evidence on note-taking, only one of which investigates the variable in an uncontaminated form. The preliminary evidence indicates that note-taking is not an effective instructional technic with the particular films used. Whether or not different films used under other conditions would show note-taking to be an adjunct to learning remains for future investigation.

### *Practice vs. Motivation*

Is increased learning during participation due to actual practice during the participation or to increased motivation resulting from the activity? Several studies directed attention to this question with no conclusive answer. Michael concluded that the increase in learning was due primarily to practice effects and not to effects of

changes in motivation to learn. Levine, on the other hand, attributed such findings to the fact that previous research was conducted under conditions of generally high motivation which might mask any motivational effects of participation upon non-rehearsed material. He found that significant gains did occur for non-practiced items as a result of participation under low motivation conditions. The Yale study found that the material directly practiced during participation was learned to a much greater degree than that not covered in the participation questions, thus supporting Michael's findings. In discussing this question, Hovland, Lumsdaine, and Sheffield suggest that both the practice and motivation factors may, in fact, achieve their effects through the same mechanism—the rehearsal of the response to be learned. They feel that the response to be learned should be actively practiced during the film and that such participation may motivate the learner by providing periodic examination of the material just presented.

*Participation and the Nature of the Stimulus*

The effectiveness of participation technics appears to be related to the nature of the stimulus presented. The research furnishes evidence on two types of stimuli in particular: (a) easy vs. difficult material and (b) the rate of presentation of the filmic material.

*Easy vs. Difficult Material.* Hovland, Lumsdaine, and Sheffield found that active participation is most effective when the material to be learned is most difficult. When the level of difficulty was related to motivation to learn and learning ability, they found that active participation was most effective with the less intelligent, non-motivated learners, learning the more difficult material.

*Rate of Presentation.* The studies that investigated this variable came to the same conclusion: that the learning of perceptual-motor skills by practicing them during the film was a function of the rate of presentation of the material. Roshal and Rimland, using the same films on knot-tieing, found no advantage to the participation technic and concluded that insufficient time was allowed *in* the film to permit the skill to be performed. Studying this speed variable, Jaspen, and Ash and Jaspen found that practice in gun assembly during the film showing facilitated learning when the film developed at a slow rate of speed and retarded learning when the

film developed at a fast rate of speed. This factor of rate of presentation may also have been operating in the Ash and Carlton Study on note-taking. It may be that where some form of *overt physical activity* takes place *during* a film presentation, the film must be so designed as to permit time for the activity to take place without interfering with other material in the film.

*Relationship to Intelligence*

Hovland, Lumsdaine, and Sheffield reported that participation benefited the less intelligent men, being 16 percent superior to non-participation. Slattery, on the other hand, found no differences by intelligence level between the results of the use of filmstrips with or without participation. It appears that insufficient evidence is yet available to permit a generalization in relation to this variable.

*Participation vs. Repetitive Showing of the Film*

The question has been raised: Why include complicated participatory technics into a film or film showing if the same learning gains can be accomplished more easily by showing the film twice in succession? This problem was investigated in four of the studies with the general conclusion that a double-showing of the film is about as effective as using participation technics. The Yale Study found this to be true, but with some sacrifice in time, it taking about 46 percent more time to achieve the same level of learning with the double-showing. Kurtz, Walter, and Brenner found the film shown twice to be as effective as the insertion of either questions or statements into the film. They found also that material *not* specifically emphasized either by questions or statements was generally learned better when presented two times than when presented in any of the experimental versions. No time comparisons were reported in the study. Hirsch found the second showing to be as effective as using knowledge of test results technics. And Stein found the double-showing at least equal to all methods of knowledge of results tested except that which preceded the film showing with a test which had identical, sequentially-ordered, and complete knowledge of results.

*Mental vs. Physical Practice*

The comparative effectiveness of mental vs. physical practice, particularly in the learning of perceptual-motor skills, deserves

careful attention. The research findings appear to contradict the popularly-held notion that activity, to be effective, must be gross overt action. It may come as a surprise, therefore, that perceptual-motor skills may actually be learned (sometimes very well learned) by merely rehearsing in one's mind, or mentally practicing, the movements involved in performing the skill. Carpenter (4) points out that gross overt action may actually interfere with some kinds of learning and that "covert" activity (mental practice) may be more or less effective than "overt" activity under certain conditions. The important thing to remember seems to be that thinking, seeing, hearing, the making of generalizations, and the like, are activities that are probably more essential in learning than gross skeletal muscle activities; and, therefore, they doubtless play an important role in the learning even of physical skills. It appears that instructional films present a model which permits the learner to practice these skills mentally as well as physically.

*General Conclusions*

On the basis of the present evidence, the following general conclusions can be made with a reasonably high degree of certainty:

1. *Learner participation during a film showing will result, under most conditions of instruction, in greatly increased learning from the film.*
2. *The overt verbalization of responses by the learner during the film showing results in increased learning.*
3. *The furnishing of "knowledge of results" of the learner's overt response during a film also has a positive effect upon learning.*

The following conclusions can be advanced as tentative hypotheses subject to further investigation:

1. *If participation during a film showing requires the practice of a skill demonstrated, the taking of notes, or the performance of any other activity that may divide the attention between the observation of the film and the performance of the activity, the film must be slowly enough paced to eliminate the distraction caused by such division of attention.*

2. *Mental practice of skills demonstrated, information communicated, or questions asked during or after a film showing will increase the learning under certain conditions.*

The technics of participation, therefore, appear to be important contributors to learning from instructional films. Teachers may apply them in their use of films within the classroom, and educational film producers may utilize the findings by "building into" films such technics where appropriate.

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# AUTOMATION AND EDUCATION:

## II. Automatizing the Classroom—Background of the Effort

• JAMES D. FINN

*This is the second in a series of articles dealing with various aspects of the relationship between automation and education. The first, which appeared in the Winter, 1957, issue of the* REVIEW, *dealt with the general relationships between the two. This article reviews the specific proposals for automatizing the classroom through audio-visual devices in terms of the organizations leading the movement and the theoretical justification for these proposed changes in educational procedure. James D. Finn is professor of education at the University of Southern California and educational consultant for* Teaching Tools *and* Film World *magazines.*

THE FIRST paper in this series (5) developed the background of that phase of the Second Industrial Revolution known as automation. It also attempted to explore generally the current and future relationships that exist or will exist between education as an institution and automation as both a complex of industrial processes and a concept of wide application to human affairs. This general study attempted to supply background so that a closer look might be taken at the application of the concept of automation to education itself.

As indicated in the first paper, the student of audio-visual communication has a special interest in any proposals that the educational process become "automated" or "automatized." The majority of these proposals have suggested that audio-visual devices, particularly television, are the means by which many pressing problems of education can be solved. In general, these proposals have been made by persons or agencies outside of the mainstream of the audio-visual movement as it has developed in this century. Much of the major work now being done in exploring this field is being carried on by groups that have not been closely associated with previous audio-visual developments. Floyde Brooker, execu-

tive secretary of the Department of Audio-Visual Instruction, NEA, has recently pointed out that ". . . many superintendents these days are talking about educational automation (films, television, etc.) seemingly without realizing that this *is* audio-visual education" (1:64).

It will be the purpose of this paper to present to the audio-visual field a statement of the rationale surrounding the proposals that audio-visual communication devices and techniques can bring automation into the educational process and thereby solve many of the most perplexing of educational problems now and in the future. This paper will discuss educational (audio-visual) automation under two general headings: (a) the institutional background, and (b) the theoretical position.

## THE INSTITUTIONAL BACKGROUND

In the decade between 1930 and 1940, two institutions can be said to have given the audio-visual movement great impetus. These institutions were the Payne Fund of New York and the Rockefeller Foundation, principally through one of its funds known as the General Education Board. The so-called Payne Fund studies on the effects of the theatrical motion picture on children and youth and the subsequent motion picture appreciation movement are now classics, not only for students in the audio-visual field, but in the field of social psychology as well.

The work of the Rockefeller Foundation is, perhaps, not as well known, but was tremendously influential. Probably the most important project created by the Rockefeller grants was the Motion Picture Project of the American Council on Education. Here, Charles Hoban, Floyde Brooker, and Francis Noel, to name but a few, discovered and perfected techniques that later almost totally governed the audio-visual programs of the Navy (Noel), the Army (Hoban) and the U. S. Office of Education (Brooker) during World War II. Those who have ascribed the startling developments in audio-visual education post-1945 to "the Armed Services" would do well to review the history of the four years immediately preceding the war when the American Council Project was in full swing.

Other projects financed by the General Education Board and the Rockefeller Foundation included the Evaluation of School Broadcasts project at Ohio State University under the direction of I. Keith Tyler, the Minnesota motion picture production project

under Robert Kissack, the Wisconsin Radio Study under Lester W. Parker, the human relations film excerpting project under Alice Keliher (with an assist from the Motion Picture Producers Association), a project with recordings, a project with film laboratories which later resulted in EFLA, the Rocky Mountain Radio Council, and several more. In addition, the Foundation trained personnel by providing fellowships for qualified people—permitting them to work in these projects, in the radio networks, and even to study broadcasting in England and Europe.

This bit of history, not too well known by many people presently engaged in the audio-visual movement, is extremely important in that it established the influence of outside institutions on what was, until the time of these projects, a halting, and almost ineffectual effort to bring audio-visual devices into American education.[1] It can be said categorically that for 15 crucial years (1930-1945) the audio-visual movement was influenced critically by two institutions—the Payne Fund and the Rockefeller Foundation. One additional point should be made clear, however. The Rockefeller Foundation, in particular, had no *specific* program for American education. The influence it provided was simply that it made money available for research, development, and the education of personnel. The result of all this activity—much good, some indifferent, a little useless—was the responsibility of the people and institutions who received the money. *The result, however, was that the audio-visual field developed and grew as it never had before.*

We come now to the present. The impetus toward this new idea of educational automation via the audio-visual route is also the product of an institution. That institution is the Ford Foundation. Much of the impetus has come from the Fund for the Advancement of Education (now merged back with the parent Ford Foundation) and its able executive vice president, Alvin C. Eurich. However, the Fund for Adult Education (another subsidiary) has also contributed with its support of educational television and educational television stations. Most of the experimental programs in closed-circuit television have been sponsored by the Fund for the Advancement of Education (in some cases, as at Hagerstown, Md., in cooperation with other groups).

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[1] The Carnegie Foundation's Committee on Scientific Aids to Learning should not be forgotten in this account, and the contributions of earlier philanthropic grants such as the Commonwealth study (Freeman) and the Eastman Kodak study (Wood and Freeman) have to be recognized. It is not the writer's purpose, however, to write an entire history of grants for audio-visual research and development. Rather, it is to point out the tremendous influence on the development of the movement resulting from the Rockefeller and Payne contributions.

There are two differences between the foundation support of the 1930-1940 period and the present. The first has to do with the amount of money expended. Evening out differences in the value of the dollar, the Ford group obviously has invested much more money in its current audio-visual projects than did the Rockefeller group. Secondly, this money has been made available in a shorter time.

However, a still greater difference exists between the two types of foundation influence, and this difference is qualitative and not quantitative. The Ford Foundation operates on a different philosophy than most of the foundations that were created in an earlier day. The Ford Foundation develops a program and sets out to implement it with grants. In the case under consideration—automatizing the classrooms of the nation—the Ford Foundation has set this as a desirable goal and has made grants for both research and development programs in order that this goal may be reached.

This implementation of a goal with money distributed to institutions in locations as far apart as Pittsburgh and San Francisco would seem to be a more efficient way of exerting influence. While the older foundations may have agreed that an area of endeavor was worth support, groups or institutions went to them with proposals, and grants were made pretty much in terms of the proposals *per se*, not in terms of whether or not the proposal fitted a program the foundation had already set up as desirable.

It may seem, upon cursory consideration, that this excursion into foundation philosophy and procedure may be an unwarranted digression in a discussion of the audio-visual automation of education. *Actually, this is probably the most important point that could be considered.* It has been established that the earlier—should we say laissez faire—grants had a large influence on the audio-visual movement. It must be soberly realized that, in the present case, we have in operation a tremendously wealthy and influential institution with a specific program for changing educational procedures, methods, and organization in the direction of classroom automation with audio-visual communication devices. *It is entirely reasonable to predict that this influence will be greater and will make itself felt in a much shorter time than anything heretofore experienced, including World War II. In studying the concept of automation in the classroom, this is the primal fact.*

The Ford Foundation, similar to other foundations, for the most part does not conduct its activities itself. Leaving out, for the moment, grants to educational institutions, school systems, and such, it has created several other institutions which now become part of the institutional background of the movement toward automatizing the classroom. It would be well, in order to round out this institutional background, to list these institutions and define the areas in which they are working.

According to the 1956 *Annual Report* of the Foundation, more than $11 million had been allocated, prior to the year covered in the report, to educational television in its various phases (6:35). During the year covered by the 1956 *Report*, an additional $8 million was added to this amount. Organizationally, the money was allocated as follows:

| | |
|---|---|
| Educational Television and Radio Center, Ann Arbor, Michigan | |
| General Program | $6,263,340 |
| Public Information | 90,500 |
| National Association of Educational Broadcasters | 94,000 |
| Joint Council on Educational Television | 140,000 |
| Committee on Television, American Council on Education | 12,000 |
| Total organizational grants | $6,599,840 |

(6:37-38)

The Foundation also has allocated $1.5 million from which to make grants to colleges and universities so that they can release time of faculty members for participation on educational telecasts. This grant is in the form of a matching grant, requiring each individual institution participating to partially match a grant of $37,500. The telecasts involved are apparently both closed-circuit and broadcast.

Mention should also be made of the underwriting of the Omnibus program which, although in a sense commercial television, is obviously educational. The productions of Omnibus by the Ford Foundation's TV-Radio Workshop also pay extra educational dividends. Some 10,000 requests for kinescopes have been received from schools and colleges (6:44). Films compiled from past programs are being distributed to additional television stations, and some have been placed on loan with the Educational Television and Radio Center. During the year covered by the 1956 *Report*, the TV-Radio

Workshop was underwritten with $1,733,887. Sponsors furnished $1,058,017 in income, leaving a deficit of $675,870 covered by Foundation funds.

Excluding direct grants (mostly through the Fund for the Advancement of Education) to schools and colleges for closed-circuit and special developments, including grants as well as paid-out moneys for the items noted above, and evening out the TV-Radio Workshop figures, the Ford Foundation has put approximately $8,700,000 in educational television in a one-year period. Over $7 million of this amount has been placed through organizations, and these organizations now become the dominating influence of this movement. Briefly, the organizations receiving over $6.5 million carry out the following functions:

*Educational Television and Radio Center*

By all odds, the dominant force in the educational television movement in the United States today, the Center develops and distributes programs to the affiliated ETV stations (six hours a week, kinescope and film, to be increased to ten hours a week); it provides information on ETV to the general public and to interested organizations, consulting services, speakers, etc. Many of the series produced under its subsidies are available in film form for use as audio-visual aids or on closed-circuit installations through a distribution arrangement with the University of Indiana. The Center has a distinguished Board of Directors, a large staff under the direction of Harry K. Newburn, former president of the University of Oregon, and has a program of bringing in, for a year at a time, specialists in film-making or television in the capacity of program associates. With the possible exception of Robert B. Hudson, Program Coordinator of the Center, not one member of the Board or of the staff has had anything significant to do with the development of audio-visual education in the United States prior to the establishment of the Center.

*Joint Council on Educational Television*

The JCET essentially is concerned with the preservation and utilization of educational television channels. It maintains legal representation in Washington, appears before the FCC, and gives advice to communities and institutions seeking aid in applying for and constructing ETV stations. In general, the members represent the higher institutions and public school systems of the United States and the operation of the JCET is in some way related to that of the American Council on Education, although this relationship is not clear from the literature (The American Council many times serves as the voice of education, particularly higher education, in Washington). The members of the JCET are all distinguished educators, none of whom has ever been associated with the audio-visual movement.

*The National Association of Educational Broadcasters*

The NAEB was a relatively small association of college and university radio stations until the advent of television and foundation subsidy. Its membership now includes educational institutions that operate either TV or radio stations, institutions which produce programs for such stations, and has re-

cently, by way of a merger, acquired the membership of the old Association for Education by Radio and Television (AERT). It has an imposing list of services to its members—technical and program consultation—and has a wide range of very valuable publications. The NAEB also operates a radio-tape network among educational institutions. Among the officers, names long associated with educational radio seem to be dominant. As of January, 1957, Burton Paulu, of the University of Minnesota, was listed as president, and Harry J. Skornia as executive director.

*Committee on Television, American Council on Education*

Compared to the three agencies above, the Committee on Television is a small operation. According to the 1956 *Annual Report* of the Ford Foundation, the Committee exists to maintain liaison with "those educators not formally engaged in the educational television movement" (6:39). Eight of the 14 members are college presidents or other high administrative officers of colleges and universities, two are public school superintendents and the other four represent agencies, associations, and like organizations. The Committee has held several conferences and produced some publications.[2]

The grants to and for these organizations and their programs have had the effect of forwarding the entire educational television effort without necessarily pinpointing the direct classroom, automation idea. The grants for such purposes have been made mainly through a subsidiary fund of the Ford Foundation, the Fund for the Advancement of Education, as noted above. The majority of these grants has been made since the 1952-1954 *Report* of the Fund (8). In that report, only one grant, $29,300, is reported as being awarded to the Montclair (New Jersey) State Teachers College to investigate the possible uses of television as a classroom aid (8:90).

Figures are not easily available since the 1952-1954 *Report* and not all accounts of the projects developed report the amount of money involved. Lombard refers to the Fund grant to San Francisco State College as ". . . over a quarter million dollars" (11:19). Carpenter and Greenhill mention that their first proposal to the Fund ". . . would cost over one hundred thousand dollars" (2:11). A search of all major libraries in the Los Angeles area revealed no report from the Fund for the Advancement of Education since the 1952-1954 *Report*. However, an approximate figure was turned up in the *NET News* for May-June 1956—a figure which can be considered reasonably accurate, as the *NET News* is published by an agency subsidized by the Foundation. The quo-

[2] The situation described above, *i.e.*, that the entire television field is dominated by agencies outside the DAVI, is a serious indictment of the officers of the DAVI (including the writer) and of the national staff. Space does not permit an analysis of the situation from the professional organization point of view and to raise questions why the Ford Foundation and its agencies have decided to ignore or shortcut the existing national educational organization which, for over 20 years, has been concerned in these matters. Such an analysis should become the number one item on the agenda for the DAVI Board of Directors.

tation reads, "In the past two and a half years, the Fund has awarded 21 grants totalling $1,590,286 to six colleges, eight universities and four public school systems for experiments in closed and open circuit television teaching" (p. 3).

Accepting these figures as accurate, the total investment of the Ford Foundation and its subsidiaries in educational television in the space of less than four years would amount to over $20 million. This is a very large amount of money, indeed, and would probably amount to almost 20 times as much as was invested by the Rockefeller Foundation and the Payne Fund in the earlier decade. The influence of such an investment will, if history is any guide, be very marked. The amount already expended by the Fund for the Advancement of Education alone can be expected to exert greater influence on American educational procedures than the sum total of all the efforts of audio-visual professionals or of the DAVI since its post-war reorganization.[3]

There are, of course, compelling reasons behind this interest and financial support of educational television and of studies and projects designed to explore the possibility of automatizing the classroom. The next section will describe the theoretical position (and certain practical factors) which has guided the efforts of these organizations and groups as they attempt to reorganize, re-orient and otherwise rebuild American educational procedures in the direction of educational automation.

## THE THEORETICAL POSITION FOR THE AUTOMATIZED CLASSROOM

Before outlining the theoretical position upon which all of the effort toward introducing television (and, to a lesser extent, motion pictures) into the educational process is based, it might be well to state explicitly just what is meant by automatizing the classroom. Essentially, the proposal is to introduce entire systems of audio-visual experiences into the classroom *in lieu* of the teacher. Thus, a fifth-grade arithmetic lesson may be taught to large numbers of 10-year-olds in a single school, a school system, or an entire county

[3] An interesting numbers game can be played in this connection. If you take Stoddard's figures as to current enrollments in elementary and secondary education as 38 million (15:15) and multiply them by the median amount per pupil spent on audio-visual education in the United States in 1953-1954 according to the NEA Research Division ($0.65) (13:118), the answer comes out about $24.75 million—not too much under the $20 million figure for the Ford grants. Actually, the figure developed from the NEA per-pupil factor is probably high, since the study received replies from only about one third of the school districts in the United States. The non-responding districts were mainly in the smallest categories where no audio-visual programs might be expected. It is probably pretty close to the truth to say that the Ford grants for educational television have been equal to or have exceeded the entire amount of money spent on audio-visual education in the public schools of the United States in a year.

by one master teacher using closed-circuit television as the medium. In a recent project undertaken by Encyclopaedia Britannica Films in connection with the ETV station in Pittsburgh, an entire course in high school physics was filmed, using a master teacher. These films may be broadcast, sent out over closed-circuit, or projected in individual classrooms. In any case, the films (162 thirty-minute subjects) would be used to convey the content of the course. Any school district may obtain the services of this expert film teacher for approximately $13,000.

The fundamental basis for this idea is the continuing teacher shortage coupled with the tremendous increase in enrollments at all levels of education from kindergarten through college. This is basic in all statements, speeches, and articles appearing on the subject. Nowhere, I suppose, is the proposition more baldly stated than by Harry Skornia, of the NAEB, as quoted by Richard Hull:

> As NAEB Secretary Harry Skornia says, education's crisis is the firmest basis for ETV's growth. We (the NAEB) were prepared for educational television. We were able to lead the way.

Hull then goes on to expand on this point of view:

> For better or worse, the rough outlines of a national framework for radio and television education have now been sketched out in a time of population pressure and an increasing array of problems for all levels of education. . . . The question is not whether to use educational television or educational radio in the educational crisis—the question is whether or not the personnel and the facilities available will be *sufficient* to meet the need in the future. (9:34)

Other evidence may be adduced to show that the crisis in teaching is basic to all thinking on the subject. Carpenter and Greenhill, in their report of the research at Pennsylvania State University on closed-circuit television, indicate that they approached the Fund for the Advancement of Education with a proposal for what might be described as "pure" research in the field of television methodology using only segments of some courses for experimental purposes. The reply they received is described as follows:

> Officers of the Fund reacted to this proposal by stating the following points either explicitly or by implication:
>
> 1. *The Fund's principal concern was with the impending shortage of teachers.* (Italics supplied.)
>
> 2. Closed-circuit television seemed to have possibilities for making it feasible for a few good instructors to reach and influence large numbers of students. (2:11)

Carpenter and Greenhill went on to say that the Fund wanted

whole courses taught by television, the feasibility of the medium studied, and the acceptability by faculty members explored.

Readers of this paper are no doubt familiar with the general outline of the facts surrounding the existing and anticipated teacher shortage. However, to construct the rationale for proposed classroom automatization, it would be well to review them briefly. Two major trends are involved: (a) the rise in enrollments at all levels of schooling, and (b) the subsequent shortage of teachers. Two publications of the Fund for the Advancement of Education (7), (15) make the enrollment trend crystal clear. Stoddard points out that there are ". . . in excess of 29 million in our elementary schools (by 1965, 36 million), over 8 million in our secondary schools (by 1965, 12 million), and over 3 million in our colleges (by 1965, 4.5 million)" (15:15-16). These startling figures are compounded by the fact that, in addition to the rise in total enrollment, the *rate* (percentage of those in any given age group) attending school is also rising. For example, 62 percent of the 14-21 age group are now in school, compared to only 8 percent in 1900. By 1960, it is expected that elementary school enrollments will be 68 percent above 1946, and, by 1969, secondary school enrollments will be 70 percent above the 1954 level (7:12).

College enrollments are somewhat harder to predict. The Ford study used two projections, one anticipating no rise in the *rate* of those attending college, the other taking a rise in rate into account. The report, however, points out that whatever projection is taken, ". . . it is evident that college enrollments are likely to reach double their 1954 level sometime between 1966 and 1971" (7:14).

The tremendous increase in enrollments obviously has a direct relationship to the number of teachers needed and the number that can be obtained. "In order to provide for replacements, expansion and the maintenance of present pupil-teacher ratios, the schools of the nation must find 16 new teachers between now and 1965 for every 10 teachers now on the job. This is the equivalent of replacing all the teachers we now have and finding 60 percent in addition—all within 10 years" (7:19). With reference to college teachers, the figures are somewhere between 16 and 25 new teachers needed by 1970 for every 10 existing today.

The matter of quality of teaching also enters at this point. Where can that many qualified teachers be obtained? And, for

that matter, how may they be obtained? The Ford study states, "About one-fifth of all 1954 graduates of four-year colleges entered school teaching. But during the next ten years one-half of all college graduates . . . would have to enter school teaching. . . . Nothing approaching this proportion . . . can be expected to enter teaching" (7:23). Stoddard estimates the shortage of fully qualified teachers at 250,000 in 1965 (15:17). At the college level, where the PhD is considered (rightly or wrongly) the mark of qualification, it is estimated that the number of *qualified* college teachers will decline *50 percent* by 1970.[4]

Coupled with the teacher shortage is a shortage of buildings and plant. While not so directly concerned with the problem, a consideration of physical plant is certainly germane because the nature of the methods used to solve the teacher shortage (class size, television, etc.) would have an effect on both the amount and nature of the plant constructed. The Twentieth Century Fund, in a special study, estimates the need under present instructional conditions for new physical plant in the public schools through 1960 to be in the neighborhood of $30 billion (16:4). Less than half of that amount is now being spent. Capital needs for *public* higher institutions (including dormitories, etc.) were estimated by McDonald at about $15 billion by 1975 (12:256). As an example from one state, Semans and Holy early this year advised the California State legislature that the capital outlay needed to expand existing units of the University of California and the California State Colleges and to add new units as necessary to meet swelling enrollments would cost approximately $1 billion by 1970 (14:79, 97). Junior Colleges were not considered in this estimate.

These are, as the philosophers say, the brute facts of the situation. The word "crisis" has been overworked, but the shortage of teachers and lack of plant facing this country in the next 20 years *is* a crisis of the first magnitude. When considered in the context of the cold war, the atomic age, the demands of automation, and the expansion of knowledge, the question can well be asked whether or not a technological society such as we are attempting to build can, in fact, provide its own means for *survival*, not to mention advancement.

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[4] This estimate is probably too conservative. It assumes that almost the same proportion of PhD's will enter college teaching as did in the 1930's. The technical requirements of industry and government have, however, changed radically. One of the characteristics of an age of automation is, apparently, a shortage of educated talent. The percentage of PhD's likely to enter college teaching will probably decline against the competition of industry and government.

The crisis has not gone unnoticed and some efforts at solutions have been made. The picture, however, is mixed. At this writing, Federal aid for school construction is bogged down in Congressional disputes; the Federal Housing loan program for colleges and universities is in danger. Some local communities are becoming reluctant to vote more taxes for schools. Gifts by industry to higher education—much of which is in the form of scholarships—are on the increase. Many states and many communities are making valiant efforts to increase school support. On the other hand, the United States Chamber of Commerce and certain widely read columnists, such as Raymond Moley, stoutly maintain that no crisis exists and the whole thing is an invention of the NEA.

Into this scene of crisis has flowed money and counsel from the Ford Foundation and its several Funds, from organizations, committees, and conferences which have been helped or stimulated by Ford money and ideas. Leading the effort has been the Fund for the Advancement of Education, and the latest statement of the position of the Fund in this matter is an extremely important booklet by Stoddard referred to above (15). Implicit in this booklet, in public statements by Alvin C. Eurich, and in the monetary grants made for various projects is that a large share of the solution to the crisis in education must come from automatizing the process through the means of audio-visual devices and techniques.

Basically, the problem has been attacked by scrutinizing the accepted pupil-teacher ratios at all levels and questioning the whole concept of class size. Eurich and Stoddard both insist that, in order to maintain quality of instruction (instruction by able teachers), class size must be increased because the number of able teachers will be smaller. Eurich points out that present pupil-teacher ratios are not sacred. Historically, the idea of one teacher to 25 students, he says, ". . . goes back at least to the middle of the third century. . . . the rule was established by Rabbi Raba . . . '25 students are to be enrolled in one class. If there are from 25 to 40 an assistant must be obtained. Above 40, two teachers are to be engaged' " (3:11). This ruling probably reflects earlier procedures and, of course, existed long before the invention of printing.[5]

Dr. Eurich further makes the point that research has never

[5] It is interesting to note that the idea that a device (in this case, printing) ought to change methodology is not new with Dr. Eurich. Twenty-five years ago, Nicholas Murray Butler said, "The lecture system as a means of communicating facts should have been dispensed with when the art of printing was invented . . ." (10:261)

proved conclusively that a small pupil-teacher ratio results in more learning (3:12). This being the case, he and the rather large group of American educators who agree with him feel that class size must be increased in order to rescue teaching quality and properly to reward teaching both economically and socially. For example, O. Meredith Wilson, the president of the University of Oregon, stated:

> But others may ask teachers to accept more students in return for higher salary on the theory that it is better to be 40 feet from distinction than ten feet from mediocrity. As Charles Johnson remarked, ". . . if we are forced to employ mediocre teachers in order to keep our classes small, we may only insure that the teacher communicate his mediocrity in an atmosphere of intimacy." (17:172)

The solutions suggested for increasing class size and the effectiveness of a given teacher include more than mere audio-visual automation of the classroom. The *aide* idea has been given much publicity. This concept is based on the comparison of a teacher's job with that of other professional workers, such as a doctor's. The doctor now has various assistants who relieve him of routine, subprofessional tasks. Studies have shown that much work in the teaching situation is of a subprofessional nature (15:21). Hence, it is felt that teachers can handle larger groups of students for the *professional* phases of their work, allowing aides to carry out routine and clerical functions.[6] The aide program has been widely discussed in the professional and popular literature and, no doubt, most readers are familiar with it. The aide idea might be considered a program separate from that of audio-visual automation except that any consideration of the use of closed-circuit television, for example, presupposes personnel handling the classes at the receiving end. In some of the college experiments, these people have been graduate assistants or other people at the lower instructional levels —aides, really. Further, Mr. Eurich himself has suggested that, part of the time, instruction must be under local people or aides, and makes reference to the fact that "clusters of people and clusters of jobs must be related to clusters of objectives" (3:16).

The aide idea, however, is only an adjunct to the concept of the automatic classroom. The automatization of the educational

[6] It should be emphasized, in this discussion of the efforts to meet the crisis of expanding enrollments and teacher shortage, that the Fund for the Advancement of Education has also spent a great deal of money in efforts to tap heretofore unavailable sources of teachers—liberal arts graduates, housewives who have left teaching, and others—with special training programs which the Fund has subsidized. However, these efforts are not in the main line of the automation movement.

process can occur only through the mass use of audio-visual devices and techniques. This was suggested by Dr. Eurich, when he said:

> In addition to making better use of teachers, education must also learn, as it has not yet learned, to make the best possible use of the numerous aids of this kind (audio-visual aids) produced and perfected by man's ingenuity. The phonograph, radio and motion pictures have long been familiar to most American households; but they remain relative strangers in the field of education, where their potentialities are vast. In television, we now have available an almost perfect educational instrument. (4:10) (Material in parentheses supplied.)

The use of television in automatizing the classroom is stated in in the following propositions by Stoddard:

> Let there be experimentation to determine, first, whether there is a practical way to incorporate television into the school program in such manner as to substitute for and lessen what the regular teacher must do so she can do the remainder better and also possibly to teach some things even more efficiently than she could do otherwise; and second, to determine which phases and types of learning experience lend themselves best to the television medium of presentation; and third, whether a high level of teaching efficiency can be attained with fewer trained teachers than would be involved in the usual school organization. (15:43)

When summarized, the thinking represented by Eurich, Stoddard, Faust, and many others associated with various television and film projects may be said to involve:

1. The introduction of mass audio-visual experiences—by picture tape, television or film—into the classroom. This would mean, for example, a whole course in chemistry or French or all of the content of fourth grade social studies taught by master teachers through one or more of these media.

2. Leaving much (perhaps all) of the *systematic* (logical, content, etc.) aspects of teaching to transmission over one or more of these audio-visual media and the *developmental* (personal, social, and growth) aspects to be handled by other persons in the classroom.

3. Large classes as audiences for the transmissions at least part of the school day. (Stoddard proposes a plan for the organization of an elementary school which includes a viewing group in a "resources room" of no less than 150 students while another group of 75 is having some kind of a mass experience in an auditorium. At other periods, students work in small groups (15:45).

4. Developing a group of master teachers who (with assistants) will prepare and deliver the lessons or lectures in a form

for audio-visual transmission. These master teachers will draw higher pay equivalent to their ability to operate effectively in the mass media.

5. Carefully planned, highly systematized lessons and lectures equivalent, perhaps, to the careful planning and programming necessary in other forms of automation described in the first paper.

6. Fewer regular classrooms, resulting in a saving of money and time and fewer positions that need to be filled by *trained* teachers, also resulting in a saving of money as well as making a dent in the teacher shortage problem. These savings could be used for the audio-visual equipment (closed-circuit television, etc.) required and to raise the salaries of qualified teachers.

7. Raising the quality of teaching (at least in its systematic aspects) because the master teachers will be experts, both in content and presentation and possess specialized knowledge not available to the line teacher. Thus, no longer will Johnny or Jane have to suffer through general chemistry with the typing teacher because the school had no one qualified to teach chemistry. The chemistry teacher now comes every day or every other day via film or television. Exercises can still be supervised by the typing teacher, but the presentation or content is not her responsibility.

This, then, is the basic theoretical position for automatizing the classroom. There are, in addition, certain factors implicit in this concept that should be stated. These factors have not been directly stated in the literature. They are:

1. A larger number of audio-visual technicians than audio-visual enthusiasts ever imagined in the wildest dreams of post-World War II will have to be found and made available for such a program. Many will be used in preparing materials for the filmed or television presentations; others, presumably, would fit into the "aide" category and render the same service to local teachers.

2. It must be recognized that the classroom automation proposal will attempt to short-cut what might be called normal audio-visual development which, granting Mr. Eurich's point, has really never achieved its potentiality in most schools and colleges of the nation. What, however, will happen to existing audio-visual libraries, and collections of equipment?

3. Such an automatization as visualized really has no limits of extension, at least until national boundaries are reached. Dr. Eurich has stated in two places (3:15), (4:13) that some of these television presentations might well be on a *national* basis. Further, the possible tie-ins, through the Educational Television and Radio Center, permit almost indefinite extension of these presentations through television stations and film circulation. In fact, considering the movement as a whole, while most of the activities of the ETRC and other organizations are concerned with *telecasting* as opposed to closed-circuit transmission, the boundaries between the two areas become almost non-existent at times. Stoddard's statement of ETV achievements, for example, jumps from a description of the St. Louis experiment which deals with *broadcasting* to the Hagerstown study, which is *closed-circuit* (15:34). Since the difference between the two is only a technical one concerned with the use or non-use of carrier waves, there is reason to believe that some automatization might originate with broadcasting stations, some with closed-circuit, and some using both at the same time.

4. The entire idea has brought the existing audio-visual movement to a point of serious crisis with no particular evidence that those who have been concerned with the movement over the last two decades are doing or can do much about it. Here and there, as, for example, at San Jose State College in California, the audio-visual people have undertaken the developments in television. For the most part, however, the power of control over this new movement for automatization rests with the organizations described in the early part of this paper.

## SUMMARY

This paper has attempted to deal with two aspects of the problem of automatizing the classroom through audio-visual means. These aspects were: (a) the institutional background in which the earlier foundation support of the audio-visual movement by the Payne Fund and the Rockefeller Foundation was compared to the present, much more extensive support of the mass audio-visual approach to teaching supported by the Ford Foundation, its several Funds and the organizations which it underwrites; and (b) the theoretical position requiring audio-visual automation which was shown to be based on the teacher and plant shortage facing this country in the next two decades of swelling school and college

enrollments and, therefore, necessitating technological solutions to problems of class size and building space.

For a complete picture, some case histories and research results, as well as a technical analysis of the entire position, would prove useful. It is hoped to supply these three aspects of the study in the next paper, to be followed, if thought desirable, by a fourth discussion which would subject the whole idea to critical scrutiny.

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# MASS COMMUNICATION MEDIA, READING COMPREHENSION, AND INTELLIGENCE

• ROBERT M. SEKERAK

*This study investigated the relationships between the reading comprehension and intelligence of junior high school students and their use of the mass communication media.* *Robert M. Sekerak is head of the department of audio-visual communications, California State Polytechnic College, Kellogg-Voorhis Campus, Pomona, California.* *This paper is based upon his doctoral dissertation completed at the University of Southern California.*

IF THE charge is true that mass communication media are interfering with the reading comprehension of American youth, research has not as yet been able to substantiate such a charge with concrete findings. We hear constantly the voiced fears of parents and teachers that children somehow are being "ruined" by television viewing and comic book reading. People have appeared before investigating committees and have stated flatly that they feel certain forms of mass communication are corrupting our youth. There is considerable speculation, based on *a priori* assumptions, regarding the effects of certain mass communication media on intellectual competence. Some educational leaders go so far as to criticize openly certain mass media because they believe them to be influencing learning adversely.

It appears obvious that much research is necessary to find factual evidence which will prove or disprove these subjective judgments. With such an end in view, this study was launched in order to reduce to objectivity as many factors as possible in the area of mass communication behavior.

## THE HYPOTHESES

The purpose of the study was to attempt to discover any relationships between the amount of time spent in contact with various

means of mass communication and the reading comprehension achievement scores of certain junior high school students.

The study was designed to test the following hypotheses:

1. There is a relationship between reading comprehension and the use of the mass communication media.
2. There is a relationship between intelligence and types of mass communication media used by the individual in his free time.

Sub-hypotheses suggested by the major areas of investigation were:

3. The non-language intelligence quotient of the individual is positively related to the amount of time spent in contact with the non-reading type of mass communication media.
4. The mass communication behavior of pupils in two consecutive years does not vary significantly.

## THE PROCEDURE

It was felt that in order to insure an accurate account of the mass communication behavior of the subjects being studied, an instrument which fit the unique situation would have to be developed. A series of pilot studies evolved a diary-questionnaire form which contained its own cross checks and validating information. The instrument was designed to assist the participants in summarizing the time each has spent in contact with the following mass communication media: television, radio, motion pictures, books, magazines, comic books, comic strips, and newspapers.

The subjects selected for the study were students at the San Fernando Junior High School, San Fernando, California. Although the entire student body participated, the data submitted by 366 eighth- and ninth-grade students were selected for final analysis. These data were selected on the basis of accuracy and completeness of reporting.

Each student submitted a daily diary of his free-time mass communication activity for two consecutive weeks. The diary-questionnaires were administered by members of the student council, under the supervision of the homeroom teacher, during the daily homeroom period.

Data thus gathered were supplemented by information

obtained from the school's records. This material included: intelligence quotients, non-language intelligence quotients, reading comprehension achievement scores, and the chronological ages of the students. Only the data provided by those students whose intelligence quotients ranged between 70 and 130 were included in the study. These limits were arbitrarily chosen as representing the limits of the "normal" range. Those whose intelligence quotients fell outside this range were considered exceptional and probably would be better subjects for another type of study.

The accumulated data were divided into four major groups for each segment of the study as follows:

Group A—high intelligence quotient, low reading comprehension score

Group B—high intelligence quotient, high reading comprehension score

Group C—low intelligence quotient, low reading comprehension score

Group D—low intelligence quotient, high reading comprehension score.

Intelligence test quotients were taken from previously administered Stanford-Binet tests; reading comprehension scores were taken from standardized reading tests which had been administered during the previous month by school counselors.

In order to test the combined relationships between intelligence and reading comprehension against time spent in contact with the mass media, the various groups were combined in pairs until each was paired once with each of the others. Frequency distributions were made for these combined groups. These data were dichotomized according to time spent in contact with each medium separately and with the total time spent in contact with all mass media. Chi-squares were made up from the upper and lower divisions of these dichotomies.

## RESULTS

Table 1 shows the chi-square data for each of the combinations as computed against time spent on each mass medium and on the total of all media. The concern in this table is with relationships in those cases where there has been above median exposure to the various mass media.

TABLE 1—SUMMARY OF THE INTERRELATIONSHIPS AMONG READING COMPREHENSION, INTELLIGENCE, AND TIME SPENT ON THE VARIOUS MASS MEDIA—GRADE EIGHT

| MEDIA | A-B | C-D | A-C | B-D | B-C | A-D |
|---|---|---|---|---|---|---|
| | IQ Constant | | RC Constant | | Joint Effect | |
| Television | NS* | NS | NS | .05(B)** | NS | NS |
| Magazines | NS | .05(D) | NS | NS | NS | NS |
| Newspapers | NS | NS | NS | NS | NS | NS |
| Radio | NS | NS | NS | NS | NS | NS |
| Books | NS | NS | NS | NS | NS | NS |
| Motion Pictures | NS | NS | NS | NS | NS | NS |
| Comic Books | NS | NS | NS | NS | NS | NS |
| Funny Papers | NS | NS | NS | .01(B) | .01(B) | NS |
| TOTAL USE | NS | NS | NS | .01(B) | .01(B) | .05(A) |

* Not statistically significant

** Letter in parentheses indicates which group had the preponderance of above median times.

The table reveals that there were few statistically significant relationships between either intelligence quotients or reading comprehension scores and the mass communication behavior of the sample population. Where significant relationships were found, however, a fairly consistent pattern was in evidence. If reading comprehension scores were variable and intelligence quotients were held constant (A-B, C-D), those with higher reading comprehension scores were found to spend more time in contact with the mass communication media. If intelligence quotients were variable (A-C, B-D), those with higher intelligence quotients were found to spend more time with the mass media of communication.

Since chi-square tests did not produce figures which might be used in making comparisons, it was decided to apply a coefficient of correlation formula to the respective data to assess quantitative relationships. The biserial coefficient of correlation formula was used for computation because the distributions in the samples obtained were not normal.

In addition to the previously examined data, the non-language IQ was used in this section of the study. The purpose was to try to find whether there was any tendency for non-language IQ to be related to time spent on such types of non-reading media as television, radio, motion pictures, and comic books.

Tables 2 and 3 list the correlations between the time spent on mass media and IQ, non-language IQ, or reading comprehension scores. When t tests were applied to the correlations, several coefficients were found to be statistically significant.

TABLE 2—BISERIAL COEFFICIENTS OF CORRELATION BETWEEN TIME SPENT ON MASS MEDIA AND IQ, NON-LANGUAGE IQ, AND READING COMPREHENSION—GRADE EIGHT

| MEDIUM | IQ | IQNL | RC |
|---|---|---|---|
| Television | +.042 | +.037 | —.032 |
| Magazines | +.097 | —.107 | +.186* |
| Newspapers | +.181* | +.054 | +.101 |
| Radio | +.081 | +.000 | +.076 |
| Books | +.221** | +.066 | +.176* |
| Motion Pictures | +.303** | +.300** | —.041 |
| Comic Books | +.097 | +.182 | —.070 |
| Funny Papers | +.410** | +.285** | +.221** |
| TOTAL USE | +.206* | +.058 | +.105 |

* Significant at the 5% level.
** Significant at the 1% level.
IQNL—Non-language IQ
RC—Reading comprehension

TABLE 3—BISERIAL COEFFICIENTS OF CORRELATION BETWEEN TIME SPENT ON MASS MEDIA AND IQ, NON-LANGUAGE IQ, AND READING COMPREHENSION—GRADE NINE

| MEDIUM | IQ | IQNL | RC |
|---|---|---|---|
| Television | —.045 | —.039 | —.023 |
| Magazines | +.232* | +.110 | +.162 |
| Newspapers | +.129 | +.065 | +.202* |
| Radio | +.000 | —.133 | —.070 |
| Books | +.192 | —.081 | +.091 |
| Motion Pictures | —.330** | —.255* | —.236* |
| Comic Books | —.070 | —.079 | —.445** |
| Funny Papers | +.252* | +.218** | +.219* |
| TOTAL USE | +.062 | —.004 | +.091 |

* Significant at the 5% level.
** Significant at the 1% level.
IQNL—Non-language IQ
RC—Reading comprehension

*The statistically significant correlations formed a slight but fairly consistent pattern.*

Both reading comprehension scores and intelligence quotients tended to correlate positively with time spent on reading type media. Those students who spent above average time in reading activities had above average reading comprehension scores. The mean intelligence quotients of those who spent more time on the reading type media was higher than those who spent more time with the non-reading media.

Time spent viewing television correlated zero (plus or minus) with both reading comprehension scores and intelligence quotients. Similarly, in the case of time spent listening to radio, all but one of the six biserial coefficients computed were zero. This gave rather strong evidence that radio and television have no special appeal to either good or poor readers; those with either high or low intelligence.

The fact that the mean IQ of those who spent above average time on the reading type media was consistently higher than the mean IQ's of those who spent above average time with non-reading media indicates a trend. Conversely, seven of the nine negative or zero correlations between intelligence and the use of mass media are associated with non-reading type media.

It was found by chi-square test that there was no significant relationship between chronological age and the amount of time spent in contact with mass media.

The range in total time spent on the mass communication media was from no-hours to 60 hours and 45 minutes. The largest segment of the total time of all groups was spent in television viewing; radio listening ranked second while comic book reading ranked last.

## GENERAL CONCLUSIONS

*The hypothesis that there is positive relationship between reading comprehension and the use of the mass communication media cannot be entirely substantiated on the basis of the findings in this study.* That there is a tendency in the direction of such a relationship, however, is borne out both in the chi-square tests and in the biserial coefficients of correlation.

It must be concluded that television and radio have universal appeal because of their wide range of offerings. As has been concluded by other investigators, the student seeks the medium

because of its content and not because of his ability to read or his lack of such ability. The data clearly indicate, however, that the often expressed *a priori* assumption that poor reading comprehension correlates directly with the amount of pupil viewing of television or listening to radio is not justified. That the use of these media either increases or reduces reading comprehension could not be defended in terms of the data secured.

*The hypothesis that there is a relationship between intelligence and the type of mass communication media used by the individual can be substantiated to some extent by the findings in this study.* A consistent tendency may be found for those students with high intelligence quotients to spend significantly more time with the reading type communication media: magazines, newspapers, books, and funny papers. Though the correlations are not high, they are sufficiently persistent to command attention.

*It is concluded that there is some relationship between the intelligence of the individual and the type of mass communication media with which he prefers to spend his time.*

Non-language intelligence correlated significantly in this study with time spent on motion picture viewing, comic book and funny paper reading. Since comic book reading may be classed as a non-reading activity, the inference might be made that there is some relationship between non-language IQ and time spent on non-reading type mass media. But, on the other hand, since the funny paper might be classified as a reading type medium, the sharpness of distinction is reduced, and it is not possible to make a clear cut conclusion with regard to non-language IQ.

Statistical analysis of the data in this study shows that there is no great difference in the amount of time spent on the mass media of communication by children who are 12, 13 or 14 years old. Although other investigators have shown that there is a gradual change in mass communication behavior of children as they progress from the elementary school through the senior high school, this study indicates that the age of the students in two consecutive grades will not make a significant difference.

*It may be concluded, therefore, that age alone is not a factor when the two groups studied are only one grade apart in the same school.*

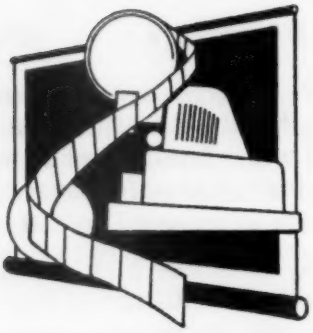
The findings of this study which show a correlation between high intelligence and interest in reading are not new. They reinforce findings of other investigators and more firmly emphasize the need for teachers to be aware of the individual differences of students

The findings of this study suggest that the junior high school level reading assignments for students of high intelligence may be profitable but for those of below average intelligence, non-language assignments might be more efficacious. A teaching aid based on the comic book principle may well be developed to assist those students whose reading development has been retarded.

*It may be concluded from this study that there is a tendency for those students with above average intelligence to spend more time in contact with all mass communication media than similar students with below average intelligence.*

This seems to imply that students with above average intelligence can derive satisfactory experiences from all types of media whether or not reading is involved. It also would seem to imply that students with above average intelligence have a greater awareness of the resources provided by their environment.

Ever-increasing evidence indicates that the mass communication media must be taken into account in the total education process. If television has such universal appeal as is revealed here, it should be given every consideration by those concerned with universal education. If children of all levels of intelligence and all abilities of reading find television viewing profitable, educators might well consider this a mandate for including the medium in the educational process.



# FILM

• ROBERT W. WAGNER

## THE CASE FOR CHILDREN'S FILMS

A "children's film," according to the rules of the International Film Festival of Edinburgh, is one ". . . which has not had a general commercial release to adult audiences and which, by a signed declaration of the producing company, is intended primarily for exhibition to special audiences of children."

This concept excludes the instructional film, even though designed for a specific age or grade level, since the emphasis is on entertainment rather than education. It also excludes the "family type" film, since children are considered a "special audience." It implies that there must be special films for children, just as we have books for children, children's theaters, children's recordings, and children's radio and television programs.

Communist-controlled countries have placed a priority on the production of films whose target audience is young people. At the Children's Film Festival in Bombay, in 1955, Russia showed 5 features and 21 short subjects for children; Czechoslovakia, 6; East Germany, 2; China, 1. It is reported that 100 puppet and cartoon films for children are being produced in special studios in Moscow each year. Not only are these films being used to indoctrinate, but also as devices by which to study child psychology, since production and research on how to make these films more effective are going on hand in hand.

In Great Britain, too, special entertainment films for children have been produced. Here the film industry itself, rather than the government, has taken the initiative. The J. Arthur Rank Organization first sponsored the production of special films for

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children in 1944. In 1951, the Children's Film Foundation, with a grant from the British Film Production Fund, carried on the work under the leadership of Mary Field.

Films produced by the Foundation, although they may be rented by schools, are shown primarily in Saturday morning children's cinema clubs or children's matinees. More than one-third of the British theaters open their doors to these cinema clubs, which have an estimated weekly attendance of 1,000,000 children. The program, arranged by the theater managers themselves, may include, in addition to a production of the British Film Foundation, one or two short subjects, a cartoon, an installment of a serial, or possibly a feature film booked from a list selected by the British Board of Film Censors as especially suitable for children.

In the United States, major studios have never produced films specifically for children.

Contrary to popular opinion, Disney's work has always been directed to the general audience. Gilbert Seldes has characterized Disney's characters as "partly Aesop with a touch of La Fontaine, perhaps, but they were never children's book animals."[1] Like the weekly television series, *Disneyland*, whose audience is 80 percent adult, *Pinocchio, Rob Roy, Cinderella, Alice in Wonderland, Tom Sawyer, Treasure Island, Snow White, Peter Pan,* and other feature films although taken from "children's classics," were produced for family audiences.

The same is true of UPA's engaging television cartoon show, *Gerald McBoing Boing*, which appears to be simple enough for children, yet sophisticated enough for adults, for whom, according to UPA's executive director, Stephen Bosustow, these films are intended.

The producers of the American entertainment film, perhaps more than any other production group in the world, are adept at creating films attractive to the widest possible audience—an audience which, in fact, in the U.S.A., is actually composed mainly of young people. The western, certain types of comedy, and the cartoon film have, in theme and treatment, a kind of universal appeal to "the young in heart of all ages."

The National Children's Film Library, established by the Motion Picture Association of America, has collected more than 60 such films, and operates under a philosophy clearly stated in its report to UNESCO in 1950:

> "In the opinion of the National Children's Film Library Committee, it is not desirable that special films be produced for

[1] Seldes, Gilbert. *The Public Arts.* Simon and Schuster, N. Y. 1956, pp. 38-39.

American children, eight to twelve. On purely theoretical grounds it is *not true* that children need special pictures in the same way they need special toys and special books. Much faulty thinking arises from this loose analogy between books and motion pictures.

"Because books must be *read*, there is a need for simply-written books for children under twelve. Children's books are needed because lack of vocabulary and of *experience that lends meanings to words* interposes an insuperable barrier between the child and the story.

"In the motion pictures, no such barriers exist. The child experiences the story content directly through his senses. He lives the story vicariously."

The report states that most "children's literature" was not really written for children at all, but is composed of fairy tales, fantasies, and folklore passed on from adults to adults, and goes on to say:

"After all, the child does not live in a 'special' world. He lives in an adult world, and from the age of eight on, he is accustoming himself to living in that world.

"When pictures are deliberately drained of adult backgrounds and implications, the world they create is an unreal one. It is narrowed, emasculated, and distorted by oversimplification. Thus, to the American child it does not ring true.

"We emphasize the word, 'American,' for our children have already had wide experience with non-juvenile films. Pictures made especially for them are not popular and are considered dull by the children themselves. Inescapably an air of condecension characterizes films—and books—made especially for children.

"Top writers, producers, directors, and actors can create films with the necessary integrity, honesty, and simplicity needed for children. But a book or a film with these qualities possess the same appeal for adults!

*"In our experience with regard to films, there is a definite area in which the tastes of adults and children happily coincide. Such films appeal to the universal audience—the young in heart of all ages. These are the subjects which we believe to be the most desirable for the entertainment and incidental education of our children through recreation."*

The premise of the National Children's Film Library poses a number of obvious assumptions:

1. That there is no difference between the perception of a child and that of the adult.

2. That, unlike words, pictures automatically overcome barriers to understanding.

3. That all children over eight years of age are alike and presumably need to be thrown, sink or swim, into a realistic, adult world.

4. That films being produced by Hollywood accurately represent that realistic, adult world.

5. That American children in particular, having seen a lot of adult films, can assimilate other adult film experiences faster than children of other lands.

6. If special films were produced for American children, they would find such films inescapably dull, unrealistic, and distasteful.

Space does not permit a complete analysis of the position of the Children's Film Library. However, certainly an important reason for Hollywood's reluctance to produce films for children is not a philosophical one at all. It is the realistic one that we can have entertainment films which are deliberately aimed at a specific, limited audience only when it becomes economically practical to make such films.

Producers of the teaching film—Encyclopaedia Britannica, McGraw-Hill, Coronet, and others—have learned, through long, hard experience, to cope with the difficult problems of producing and marketing non-theatrical films for specific levels of childhood. But the impetus for the production of entertainment films for children has gained whatever momentum it has in the United States because of a need for material for children's television programs which, in turn, have been stimulated by the realization on the part of national advertisers of the potential of the child market.

The *Mickey Mouse Club*, for example, is a daily, hour-long vehicle for advertising soft drinks, vitamin tablets, adhesive tape, and, of course, Disney's own films, his Mickey Mouse Magazine, the Disneyland Amusement Park, and other Disney products and enterprises. But it has also resulted in the development of new cartoon films, a children's newsreel, and occasional children's documentary subjects, sometimes narrated by one of the "Mouseketeers"—members of a kind of sophisticated "Our Gang."

Perhaps, in the long run, the small, independent producer may be better situated economically and methodologically to make films for children than the major producer in Hollywood. The successful Picture Book Parade films which appeared on *Captain Kangaroo* (CBS-TV), for example, were produced by a very small production unit, with a minimum of technical gadgetry.

Described as "iconographic" to distinguish them from conventional cell-animation, these films are simply, as Morton Schindel, the producer, describes them, "a combination of fluid camera action upon pictures, illustrative music, sensitive reading of the text, and suggestive sound effects." The art work is taken directly from favorite children's books including *Millions of Cats, The Story about Ping, Hercules, Stone Soup, The Red Carpet, Andy and the Lion, Make Way for Ducklings,* and others.[2] And while they were used on television to entertain, and to help sell cough drops, candy bars, and a brand of children's shoes, they brought to the younger age groups an experience designed specifically for children.

Can the adult perceive as the child? Can he duplicate, in content and form, the true level of understanding involved? Are adults, as Lewis Carroll rhymed to his youthful listener, "but older children, dear, who fret to find our bedtime near?" Or is the making of a child's book or film the process of picturing the reminiscences of old men and women who can only recall a child's world as it was?

If the truth could be known, we would probably find that many audio-visual materials designed for children are little more than exercises in adult memory and, as Santayana put it, "a man's memory may almost become the art of continually varying and misrepresenting his past according to his interests in the present."

We have much to learn about how children see. We do know that there is such a thing as "film illiteracy," and that a picture, even though ordinarily more readily understood than a word, is nevertheless still a symbol which must be "read." [3]

We know, too, that children's appreciation and understanding of pictures shift with age. Just as Wolfe and Fiske's studies of children's comic reading show that Bugs Bunny, Porky Pig, and other anthropomorphic characters are replaced in popularity by adventure stories after about age 12 and by "true" comics and classics after that, so the child's motion picture preferences also shift.[4]

A recent survey of picture preferences of 5500 British school children showed that those under six years of age preferred childlike, imaginative conceptions while those over six showed a marked preference for the factual. But there was also some suggestion of

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[2] Available from Weston Woods Studios, Westport, Connecticut. Most are ten minutes, sound. Sale price: $50, black and white; $100, color.

[3] Peters, J. M. L. "The Necessity of Learning How To See a Film." *Audio-Visual Communications Review,* Summer, 1955, pp. 197-205. Spaulding, Seth. "Research on Pictorial Illustration." *Ibid* Winter, 1955, pp. 35-45.

[4] Wolfe, Katherine M., and Fiske, Marjorie. "The Children Talk Comics." *Communications Research, 1948-49.* Lazarsfeld and Stanton, Harper, 1949, pp. 3-50.

national and ethnological differences. A small sample of American and Chinese students included in the survey responded somewhat differently than the British group.[5]

Mary Field's studies of children's film preferences show that children from 7 to 12 years of age wanted to identify themselves with other children on the screen, and that the "good guys" have to win out over the "bad guys" until adolescence, when this outcome becomes somewhat less important. Field also notes that children's films are conceived differently in Europe, where they are mainly considered to be the puppet, cartoon, fairy story type, and in the United States, where they might also include westerns and fantastic adventure films.[6] It might be added that these differences in conception are also affected by differences in the sociological and economic nature of the film industries of Europe and America. In short, the concept varies in different cultures, and what a children's film is depends upon what adults in those cultures think it should be.

Adult conventions in technique or the "grammar of the film," for example, are also questionable in films for children. The use of optical effects such as fades, dissolves, wipes, and the like, is probably not justified because they may be neither noticed nor understood at the elementary level. The length of such films, the rate of development, the use of sound effects, music, and other elements in children's entertainment films might well conform to findings already noticed in the field of educational film production. Experiments at Edinburgh during 1955-56 indicated that child commentators command attention not given to adult voices on film, that color attracts but of itself does not hold attention, and that children do not like to see other children misbehaving on the screen.

Perhaps, in the production of children's films we have left out the principal ingredient—children themselves.

Some attempts have been made to get children to picture their own world on motion picture film. Here and there, in the case of children's workshop films made in England, for example, we find films being made by children themselves. In experimental films made at the University of California at Los Angeles, professional film makers have encouraged children to supply the art work from which such films might be made. At Weston Woods Studios children are participating in production as critics and narrators, and are as much a part of the studio as the camera itself.

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[5] Bethers, Ray. "What I Now Know About Making Drawings for Children." *Visual Education*, Oct. 1956, pp. 2-5.

[6] Field, Mary. "Children's Taste in Films." *Quarterly of Film, Radio, Television*, Fall, 1956.

New approaches and new production techniques are needed in this field. Perhaps, instead of relying solely on existing children's literature as a source for children's films, we might let children make up and record their own stories, letting them draw or paint the pictures to go with their recorded text. The use of child narrators and child actors is becoming more common.

Children talking to children must certainly be one of the significant ways in which learning takes place. Children talking to children on film might be the most accurate reflection of the child's world—a world of the low-angle, a vivid, simplified world free of adult sophistry. Such films need not be unrealistic, dull, or unimaginative. Such presentations might not only improve the child's appreciation of adult films, but also might teach adults something important about how to communicate with young people across the inevitable barrier of age.

By bringing the child "into the picture," by becoming concerned with entertainment films for specific age levels, we might bring more uncensored pleasure to children and more insight to adults.

# BOOK REVIEWS

**HEAD, SYDNEY W.** *Broadcasting in America; A Survey of Television and Radio.* Boston: Houghton Mifflin Company, 1956. 502 p.

**BOGART, LEO.** *The Age of Television; A Study of Viewing Habits and the Impact of Television on American Life.* New York: Frederick Ungar Publishing Co., 1956. 348 p.

**Reviewed by**
**• GEORGE GERBNER**

Seldom, if ever, have students of the mass media been treated to the appearance of two such books as these in the same year. For the study of popular culture as a serious aspect of social science, this event is a milestone along the road to maturity.

These two volumes bring together more reason and evidence on the broad subject of broadcasting and its social impact than can be found in any other two books. The great debate about the nature and role of the public arts in America will, no doubt, continue—as it should. But no longer need it continue in ignorance of the known facts of mass cultural life for all but the specialist.

*Broadcasting in America* is broader in scope. Sydney W. Head, who is director of broadcasting and film services at the University of Miami, devotes four chapters to the physical bases of broadcasting, seven to its origin and growth, eight to its economics, and seven to social control.

A special contribution of Head's historical section is his brief but illuminating account of the turbulent background of patent wars, rivalries, mergers, and business and political strategies of the industrial empires that established the pattern of private and public policies in the communications field.

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Head's analysis of the economics of broadcasting includes a discussion of the anomaly of non-licensees (i.e., advertising agencies) controlling substantial blocks of programming. In his survey of the political, legal, and administrative aspects of social control of broadcasting, he tackles the hackneyed contention of audience-control ("giving the public what it wants").

He terms this the "quantitative theory" which considers programs merely as means to an end and not as ends in themselves. In Head's view, this theory equates "wants" with sales, leads to an abdication of responsibility for other consequences, and, indeed, betrays contempt for the public as human beings. Besides, "the phrase 'giving the public what it wants' denies the obvious and highly relevant fact that commercial broadcasting is not a matter of 'giving' but of selling. If any giving is involved, it is the giving of licenses to use the public's radio frequencies for commercial purposes, for which no charge is made."

Head's discussion of the relationship of regulation to freedom is highlighted by his application of Meiklejohn's distinctions to problems of broadcasting. That is the contention that speech which serves private ends is subject to due process in the public interest; speech which serves public ends qualifies for the unrestricted protection of the First Amendment.

The breadth and scope of *Broadcasting in America* is matched by the depth of Bogart's inquiry into what *The Age of Television* means in the lives of people. Leo Bogart is director of account research for McCann-Erickson, Inc., one of the largest advertising agencies. This affiliation has given him access to much unpublished, private trade material, in addition to the more accessible data, and, more significantly, it appears to have in no way blunted the edge of his critical analysis.

*The Age of Television* weaves together the results of hundreds of individual research studies on television content, viewing patterns, social setting, and effects on other media, on advertising, on sports, on politics, and on juveniles. As in *Broadcasting in America*, the wealth of factual material—in lucid tabular form as well as in the text—illustrates and supplements the discussion of issues in a skillful blending of reason and evidence. Stress is on the substance and implications of the findings; methodology comes in only as it relates to the validity of the studies.

There are some inevitable conflicts between two such comprehensive works. For example, Head reports that "networks set out to recapture their own programming from the advertising agencies," and by 1955 originated 32 percent of all network programs. Bogart,

citing other sources, notes that in the same year "networks control only half of the 844 hours of weekly network programming." Perhaps the difference can be accounted for by different interpretations of "origin" and "control." But, at any rate, occasional divergence in facts and figures make the two books complement rather than cancel out one another. And there is no conflict in the approach of the two authors toward their material. Caution, integrity, and a sense of human responsibility, they share in common.

Bogart tackles the issue of "giving the public what it wants" merely by stating that for the advertiser the public is part of a market with its wants ("buying instinct") to be roused and its spending kept up and up. He is aware of some implications of the possible tyranny of sales over programming, of television potential to increase social and cultural conformity, of the scarcity of continuous critical commentary on broadcasting policy, and of the consequent complacency on the part of some broadcasters.

These two volumes are well suited to form the textual backbone of a college course on social and other aspects of broadcasting, or of the layman's and teacher's library on the mass media.

**LESTER B. SANDS.** *Audio-Visual Procedures in Teaching.* New York: The Ronald Press Company, 1956. 670 p.

Reviewed by

• **WESLEY C. MEIERHENRY**

The textbook, *Audio-Visual Procedures in Teaching* by Lester B. Sands, Professor of Education, Santa Barbara College, University of California, is an imposing volume of 670 pages. The book is entirely in black and white with the exception of the cover which gives the book title and the author in yellow type, with a gray background.

The chapter organization is an interesting one. Instead of grouping related techniques and materials together by sections, the author has devoted individual chapters to each of the major audio-visual aids. The reasons for doing this, as set forth by the author in the preface, are:

> The book is organized into 31 chapters for studying the major types of audio-visual procedures and equipment. Each type is set forth separately, so as to stress its uses, possibilities, and limitations. It is the author's belief that this organization avoids confusion and misunderstanding. At the same time, care has been taken to relate each type of aid to the whole teaching process and to bring out its inherent powers for serving the curricular needs of individuals

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and groups. The philosophy underlying this approach is the opposite of a mechanized or gadget-minded attitude. It is a philosophy which is based on the fruitful experiences of teachers, the contributions of curriculum leaders, audio-visual specialists, and educational scientists, and the author's observations experiences and interpretations.

This type of organization should be helpful to those individuals who do not like to be bound by the organization of a textbook. It will permit selecting chapters for study without reference to their sequence in the book. The chapters usually deal with quite specific topics although the flat picture is discussed along with cartoons, posters, and murals. These latter visual presentations are usually thought of as being in the category of graphic aids. Radio and television are also considered jointly. In view of all of the experimentation with television, it probably deserves individual attention as well as more extensive consideration than is given to it.

The organization of individual chapters is also original. Each chapter usually begins with a general discussion of the topic. In a number of cases, it involves a hypothetical conversation or discussion which is intended to show the desirablity and necessity of using the aid covered in the chapter. Following this introduction there is frequently an application of the aid to the elementary school, the secondary school, to higher education, and to adult education. This latter part of the chapter is intended to show the practical application of the aid.

The author's writing is at times colorful and usually lucid. The vocabulary sometimes presents a challenge to the reader and is perhaps designed to show that an audio-visual specialist can also be a highly literate person. The book is very well illustrated. In some cases, however, the photographs are unimaginative since they show only the material or piece of equipment without reference to a classroom situation.

Among the strong presentations is the one dealing with photography. Not only does the author develop the place of photography in teaching but he also gives some very helpful suggestions as to the way in which the neophyte may improve his photographic techniques.

The book contains very little reference to research findings with the exception of the chapter on motion pictures, which is very well documented. This does not mean that the material presented in other chapters cannot be substantiated or supported. The mature graduate student and research worker would prefer, however, to have some indication of supporting evidence for the conclusions which are reached by the author.

An outstanding part of the book is the series of special appendixes, each of which presents invaluable information. Appendix A on audio-visual associations lists national, state, and local organizations with brief descriptions of the purposes of each as given by a responsible officer of the organization. Appendix B deals with audio-visual periodicals published both here and abroad. Again in this instance, the major purposes of each of the magazines is given by a member of the editorial staff. Appendix C covers free and inexpensive audio-visual resources. It includes reference to the various guides to free and inexpensive materials, materials from museums and libraries, sources of materials in periodicals, and governmental publications. Appendix D presents a bibliography of selected references. There are no references at the end of each chapter, but instead a rather complete bibliography for each chapter is found in this appendix. Appendix E deals with the sources of materials and equipment. This list of sources is organized according to chapters. For example, Chapter 13 deals with the map and other graphic aids. This appendix lists the major producers of maps and related materials in the United States. Appendix F shows photographs of the major motion picture projectors along with a threading diagram of each.

A suggestion which will likely draw some criticism from many audio-visual specialists is that all classrooms need not necessarily be provided with some type of dark-out facility in order to have the best audio-visual program. For example, in Chapter 20 on the motion picture, the author says:

> It is maintained by some educators that every film ought to be shown in the pupil's own classroom rather than in an auditorium or audio-visual room, and that moving a class to see a picture is a disturbance to continuity. No findings of research settle the question either way, but experience with students strongly suggests that moving a group to another room for a film showing distracts them neither more nor less than stopping for recess or luncheon or for getting a book out of the library. The teacher may resent being moved, but that is a personal foible. There is, of course, nothing whatever against showing a film in the classroom if all the conditions are completely satisfactory—as, in the standard classroom, they seldom are.

Again in Chapter 25 on the complete classroom, under the topic of "audio-visual rooms," he states:

> Because of difficulty and expense of darkening the classroom and for other reasons, many schools have prepared special audio-visual rooms for general projection. Scheduling such a room involves problems, but not so many as the attempt to darken all classrooms in a large building; and the special room can be outfitted with a completeness hardly possible in the individual classroom.

All things considered, the book makes a contribution to the rapidly increasing number of volumes being written in the audio-visual field. The book will no doubt be used widely as a supplemen-

tary and resource book as well as a basic textbook in audio-visual classes. Because of its organization it will probably also have wide usage in professional school libraries and for inservice programs in school systems.

**McCLUSKY, F. DEAN.** *The A-V Bibliography.* Dubuque, Iowa: Wm. C. Brown Company, 1955. 218 p.

Reviewed by

● **L. PAUL SAETTLER**

In 1950, F. Dean McClusky compiled the first comprehensive bibliography of the literature on audio-visual communication. Prior to this time, only two bibliographies had been prepared which could be considered extensive in a selected area of the audio-visual communication field. These were J. J. Weber's *Bibliography on the Use of Visual Aids in Education* published by the *Educational Screen* in 1930, and John S. Carroll's *Annotated Bibliography on Visual Education* prepared by the Connecticut State Department of Education's WPA Visual Education Project in 1939. Other bibliograhpies have since been published, but they have been more specialized or limited in scope.

McClusky's second, completely revised edition of *The A-V Bibliography* is another important contribution to the audio-visual communication field. His new bibliography possesses particular merit because it admirably supplements the first edition. For example, nearly 2000 new items have been added, and McClusky has judiciously deleted a large proportion of the references which appeared in the first edition so that new ones could be included. Thus, the two editions, when used together, effectively complement each other.

*The A-V Bibliography* is divided into eight parts, namely: (I) The Philosophy and Psychology of Teaching with Audio-Visual Materials; (II) Audio-Visual Teaching Materials and Their Use; (III) Elementary Schools; (IV) Secondary Schools; (V) Higher Education; (VI) Administration of Audio-Visual Instruction; (VII) Research on Value and Utilization of Audio-Visual Materials; and (VIII) Miscellaneous. The parts have also been broken into various sections.

This edition has no new parts, but six sections have been added. In Part VII, sections on Television, Masters Theses and Miscellaneous, Doctoral Dissertations (beginning with 1921), and

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the Pennsylvania State College Instructional Film Research Program Technical Reports appear for the first time. New sections on Handicapped Children and Safety Education have been included in Part VIII, and three sections, one in Part II, and two in Part VII have been considerably extended. All of these additions are needed and will serve a useful purpose. It is hoped, however, in subsequent revisions that sections on duplicating devices, facsimile, human relations, metalinguistics, kinesics, group dynamics, perception research, linguistics, anthropology, and automation will be added.

A bibliography which attempts to encompass such a broad and complex field as audio-visual communication will usually succeed in achieving only a degree of completeness. McClusky does not pretend or claim to have accomplished this difficult task, but, nevertheless, he has approximated it to a remarkable extent. Perhaps, every specialist in audio-visual communication would be particularly sensitive to the omission of an article, monograph, research study or book germane to his specialized area and interests. Your reviewer is no exception in this respect. For instance, he has noted the conspicuous absence of the following publications: Weber's *Visual Aids in Education;* Frost's *Education's Own Stations;* Adams *Exposition and Illustration in Teaching;* Langer's *Philosophy in a New Key;* Wiener's *Cybernetics;* Klapper's *The Effects of Mass Media;* Miller's *Language and Communication;* and Luckiesh's *Vision, Light and Seeing.* Others could be mentioned, but these will suffice to illustrate how difficult it will always be for any compiler of an audio-visual bibliography to cover the diverse areas of this field.

Undoubtedly, future revisions and publications of *The A-V Bibliography* will continue to serve a vital function and meet a growing need. This reviewer is grateful to a great audio-visual pioneer who has made it possible.

**STATE OF INDIANA DEPARTMENT OF PUBLIC INSTRUCTION.** *The Audio-Visual Program.* Bulletin No. 218, Indianapolis: the Department, 1956. 184 p.

Reviewed by
• **WILLIAM GNAEDINGER**

Most recently at hand among the growing list of state audio-visual handbooks or guides is that of the State of Indiana, *The*

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*Audio-Visual Program*, released by the superintendent of public instruction in the spring of this year.

The manual, defined in its Foreword as "a systematic guide to the development and use of audio-visual materials" was prepared by a committee and cooperating group of Indiana school and college audio-visual workers, under the general chairmanship of Altha J. Sullivan of the Indiana State Department of Public Instruction.

It is organized into 10 chapters, dealing first with curricular implications of audio-visual materials; then particularizing in separate chapters on factors affecting the selection, use, and management of audio-visual materials in schools, on problems and procedures of administering and financing audio-visual programs, and on plans for future programs. Each chapter includes recommendations for specific procedures to follow and other measures which reflect minimum essentials for effective audio-visual service, and Chapter IX, "Planning for the Future," presents a very detailed and complete outline of criteria for judging the adequacy of audio-visual programs in various sizes and classes of schools.

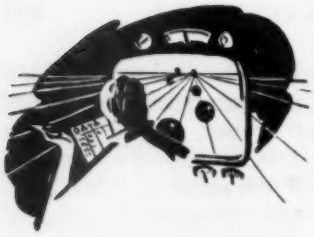
Also in Chapter IX is a reprinting of the *Regulations of the State Board of Education Affecting the Audio-Visual Program.* Additional useful reference material is supplied in an appendix, whose highlights are a sample resource unit, a comprehensive bibliography on school audio-visual administration, and a list of films and filmstrips useful in inservice (or other) audio-visual teacher training.

Every such publication is a "first," if only within its own regional confines. *The Audio-Visual Program* shares this, but adds a few features which are lacking or less evident in other state handbooks and manuals. For example, though addressed primarily to school administrators, this manual has some especially useful sections for teachers; notably the first two chapters and the suggestive arrangement of the content and approaches in the same resource unit. Also, for a first time, we have a very complete statewide standard for judging adequacy of a school's audio-visual program, and to provide specific goals for program development.

The manual is quite frankly promotional in its approach, but makes no extravagant claims. Rather, recommendations, criteria, and formulae are presented in well-documented or well-rationalized style. It should be both encouraging and stimulating to the administrator who peruses it; or, if he can be encouraged to do so, keeps it handy for regular reference.

Personally, the writer would also have liked to find well-defined and specific guides both to management of inservice programs, and promotional devices for use in and out of school. These matters are not ignored, but much reference to them is scattered or buried.

On the other hand, there is a feeling of personal indebtedness for a new and fresh group of guides in the form of standards, recommendations, and formulae which can be highly useful to the professional audio-visual worker, in or out of Indiana.



# RESEARCH ABSTRACTS

## TELEVISION

**HUMAN ENGINEERING DEPARTMENT OF U. S. NAVAL TRAINING DEVICE CENTER.** *Instructional Television Research Reports.* NAVEXOS P–1544, U. S. Naval Training Device Center, Office of Naval Research, Port Washington, L. I., New York. June 1, 1956.

*Purpose:* The purpose of this volume was to combine and summarize reports to show areas of successful application of television to training and areas requiring further research.

*Results:* Television was shown to be as effective or more effective than regular instruction. The high initial costs, large personnel requirements, difficult operation and maintenance requirements, and complicated programming have restricted its use. It was recommended that, since television is a good instructional medium, it is important to discover whether it can be made acceptable and compete effectively with other instructional media. This can be done by considering its cost, effectiveness, personnel requirements, programming requirements, and its acceptance by all persons involved. Television systems employing a minimum of equipment and personnel should most nearly meet these requirements. Television should be used in those other instances where the unique characteristics of television make its use clearly advisable regardless of costs and operational problems.

The following is a summary of television research results followed by a list of reports included in this volume.

### SUMMARY OF INSTRUCTIONAL TELEVISION RESEARCH REPORTS

#### A. *LIVE INSTRUCTIONAL TELEVISION FOR THE CLASSROOM*

1. *Effectiveness.* A television program can be at least as effective as comparable means of instruction (476–02–S2, 476–02–S3).
2. *Acceptance.* Television instruction is well liked (476–02–S2, 530–01–1). Well-prepared programs were highly acceptable after an eight-week period of television training (476–02–S3).
3. *Mass Training.* Television is a feasible and effective means for instructing widely separated groups (476–02–S2, 476–02–S3).

4. *Principal Problems.* (476–02–S2)
   a. Procurement and training of personnel for planning and producing television lessons.
   b. Procurement of television equipment and personnel to maintain it.
5. *Retention of Learning.* Most learned material was retained over a six-week period (476–02–S3).
6. *Level of Instruction.* All grades of personnel learned from television programs (476–02–S3).
7. *Novelty Effect.* In 1950 trainees said that the television instruction they received was more effective than the average training film. This instruction was carefully prepared, skillfully presented and the trainees tried to learn (476–02–S3).
8. *Effective Presentations.* Items that were explicitly covered were well learned. Sketchily treated items were not learned (476–02–S3).
9. *Dramatic or Factual.* Learning occurred when specific information was presented. Little learning occurred from dramatic or situational presentations (476–02–S3).
10. *Introductions.* Speeches by high-ranking officials were with few exceptions too long, quite boring, poorly reproduced, and detracted from the instructional value of the programs (476–02–S3).
11. *Screen Size.* Twelve- to twenty-inch television screens were said to be adequate by trainees (476–02–S3).
12. *Applicability.* A criteria checklist has been developed to determine courses of instruction which are suited for television instruction (530–01–1).
13. *Single Camera.* One television camera will fulfill most military training needs, but for reliability and flexibility, two cameras are more desirable (530–01–1).
14. *Instructors.* Qualified instructors can be trained to teach by television in a relatively short time (530–01–1).
15. *Minimum Equipment Television.* Experience has indicated that a minimum of equipment gives the greatest training per dollar expended for televising (530–01–1).
16. *Courses.* Effective television training has been carried out in large numbers of subject areas (530–01–1).
17. *Films.* Films are effective on television (530–01–1, 476–02–S2, 476–02–S3).
18. *Television Recordings (kinescopes).* Film recordnigs of television programs are a valuable byproduct (530–01–1, 20–TV–1, 476–02–S2).
19. *Mobile Television.* A mobile television studio and associated equipment can be used to present and record television programs.

B. *FILM RECORDINGS OF TELEVISION PROGRAMS*

1. *Effectiveness.* Film recordings of television programs (kinescopes) are very satisfactory for military training even though picture quality may be poor (20–TV–1, 476–02–S2).
2. *Use.* Kinescope recordings were recommended for training instructors, duplicating lessons, disseminating new developments, and as a substitute for instructional films (530–01–1).
3. *Color.* Color, unless it is essential to the subject being taught, does not increase the effectiveness of television training (20–TV–1).

C. *SPECIALIZED TELEVISION APPLICATIONS*

1. *Training Device Viewing.* Training devices may be televised to a larger group than can normally see them (530–01–1). Thirty-one principles for improving visibility have been discovered (20–TV–2).
2. *Security Applications.* Television signals containing classified information can be transmitted to the classroom over a closed-circuit cable (476–02–S3).
3. *Critical Factors.* Television expense and labor can be more easily justified when the training situation is dangerous or mass training is essential (530–01–1).

D. *INCIDENTAL TELEVISION INSTRUCTION* (Audience may or may not watch.)

1. *Dramatizations.* Dramatic treatments brought about less learning than other types of treatment (476–02–S2).
2. *Attitudes.* Polls have shown a definite acceptance by civilians of programs dealing with book reviews, social problems, history, lectures, etc. (530–01–1).

## INSTRUCTIONAL TELEVISION RESEARCH REPORTS

Government activities may obtain copies without charge by submitting request to the Commanding Officer and Director, U. S. Naval Training Device Center, Port Washington, New York, Attention: Code 4221.

Non-government activities may purchase copies from the Department of Commerce, Office of Technical Services, Washington 25, D. C.

| *Title* | *NAVTRADEVCEN Technical Report No.* |
|---|---|
| The Effectiveness of Television Instruction in Training Naval Air Reservists (Technical version of No. 476–02–2) | 476–02–S2 |
| A Study of Learning and Retention from Television Instruction Transmitted to Army Field Force Reservists (Technical version of No. 476–02–3) | 476–02–S3 |
| Learning from Kinescopes and Films | 20–TV–1 |
| Visual Principles for Training by Television | 20–TV–2 |
| Survey of Television Utilization in Army Training | 530–01–1 |
| Relative Effectiveness of Verbal Introductions to Kinescope Recordings and Training Films | 269–7–42 |
| Evaluation of Two Kinescopes | 269–7–38 |

*—L. Twyford*

**VERNON, M. D.** "Perception and Understanding of Instructional Television Programmes." *British Journal of Psychology,* Volume XLIV, Part 2. May 1953. 11 p.

*Purpose:* The purpose of this research was to discover how viewers are impressed by seeing an instructional television program and to discover valuable features of the program and the most effective way of conducting them.

*Procedure:* A total of 99 persons observed one or more television programs in groups of not more than ten. They were told to write down a brief account of what the program was about. After writing the reports, they were questioned as to features of the program that had interested, bored, or confused them. The programs covered modern building and town planning, political and international affairs, and the effects of temperature on the human body.

*Results:* Visual material interested the viewer and caused him to attend to the program, yet his recollections were usually based upon what was said. Visual and verbal content must be integrated into a single, meaningful whole. Visual material may be more detailed than the verbal content and distract the viewer's attention. A clear, continuous, and logically coherent verbal argument is essential to ensure understanding and remembering. The impression of reality in a television program is exceedingly valuable in attracting and interesting the viewer and convincing him of the truth and importance of what he sees and hears. It is more difficult to grasp reasoning about cause and effect than to learn simple concrete facts; it is very much harder for program designers to choose material for demonstrating such reasoning, and it tends to be relegated to the sound channel alone. The actual reality and three-dimensionality of televised objects cannot produce in itself the strong impression of reality from unfamiliar objects that are immobile, small, and lacking texture.
—*L. Twyford*

**CRILE, LUCINDA.** *Some Findings from Television Studies.* Extension Service Circular 490, 1953. United States Department of Agriculture, 1953. 32 p.

*Purpose:* The purpose of this publication was to present reliable information on the use of television for agricultural extension work.

*Procedure:* Thirty-one reports were abstracted, and annotated entries of one page length were prepared.

*Results:* The television studies were classified into three categories (1) education by television, (2) techniques of television use, and (3) station time devoted to types of television programs. The findings cover educational results, general social effects, visibility of visual materials, types of equipment, learning from kinescopes, viewing practices, and effects on other media.—*L. Twyford*

**VANCUAR, RUDOLPH H.** "Flesch Readability Formula Applied to Television Programs." *Journal of Applied Psychology* 39, No. 1: 47–48. February 1955.

*Purpose:* To measure the audible vocabulary of television programs with the Flesch readability formula.

*Procedure:* Two categories of television programs were chosen: (a) 8 daytime daily programs with one main person talking, and (b) 25 evening once-a-week programs. This was done in Omaha, Nebraska, in February 1953. Five 100 word taped samples were analyzed by the Flesch formula giving Mean Reading Ease scores and Mean Human Interest scores. Telepulse (popularity) ratings were also taken.

*Results:* In the daytime programs Mean Reading Ease scores ranged from 90 (Your TV Home) to 55 (TV Classroom) and Mean Human Interest scores

from 62 (Your TV Home) to 32 (Noon Edition). The rank-order correlation between these two scores was .89, significant at the 1% level. Corresponding data on the evening programs were 98 (Goodyear TV Playhouse) to 78 (Life Is Worth Living), 127 (Playhouse of the Stars) to 54 (Boxing on Friday Night), and a correlation of .59, significant at the 1% level.—*Paul Wendt*

**SCHOOL BROADCASTING COUNCIL FOR THE UNITED KINGDOM AND THE BRITISH BROADCASTING CORPORATION.** *Report on the School Television Broadcasting Pilot Experiment.* March 10, 1953. 15 p.

*Purpose:* This pilot experiment was done to study television techniques in relation to the tasks which a service of television broadcasts to schools might be expected to perform.

*Procedure:* Twenty programs 30 minutes long were broadcast to six schools during May 1952. The subject matter units covered science, current affairs, craftsmen and artists, geography and the industrial scene. Fifteen- and twenty-one-inch sets were used in darkened rooms. Classes consisted of about thirty-five students aged 11 to 15. Normal conditions were employed insofar as was possible with such a novel arrangement. After each program the topic was discussed for about twenty minutes.

*Results:* The programs were felt to be interesting; however, several programs failed to exhibit a clear and simple educational aim. Production standards were criticized when they fell below that anticipated. It was not possible to assess alternative presentation techniques. On-the-spot telecasts were well liked but the value of immediacy could not be assessed. Studio dramatizations were not considered to be a complete success. Children appeared to respond more to the friendly person than to the expert in the subject matter. Studio discussions were found to be satisfactory but tended to be too lengthy. The five subject matter units were each effectively presented and enthusiastically received. Larger screen size was felt to be desirable. Integration of television into classroom appeared to be no more difficult than integration of radio into classwork.—*L. Twyford.*

**SIGNAL SCHOOL, FORT MONMOUTH.** *Teaching by Television—A report on the Experimental Use of Television in Technical Military Training.* The Signal School, Fort Monmouth, New Jersey 1953. 45 p.

*Purpose:* This study was done to discover the extent to which television could be used as an aid in presenting the various technical subjects taught in the school. It was desired to investigate the effectiveness of television, student reaction, suitability of training aids, program types best suited for television instruction, applicable subjects, personnel requirements, budgetary considerations, economy, other uses for television, training instructors for teaching by television, equipment maintenance, technical equipment and practices, and communication from classroom to studio.

*Procedure:* Elements of Radio was taught for eight months by television. For an additional eight months television instruction on a variety of subjects was given for a total weekly schedule of twenty-seven hours.

*Results:* The following is a brief summary of a wealth of detailed recommendations and findings found in the report. Television instruction was at least as good as regular instruction. More than half the students felt that it was as good as standard instruction. Training aids designed for classroom use were satisfactory for television. Demonstrations were best suited for (a) television followed by quiz programs, (b) participation in practical exercises by all viewing students, (c) laboratory exercises, (d) conferences and (e) lectures. Most courses which can be taught by lecture methods can be taught via television. Six men performed all operations; however, 15 men were recommended. The yearly cost of a typical television system would be $46,200. Television is economical only when a large number of students can be reached simultaneously. Television can be used for student orientation, command conferences, instructor training, and reservist training. Little training of a television instructor is required if the instructor displays strong aptitude for teaching via television. Maintenance is a minor problem when capable personnel are available. A minimum of two cameras is needed. Studio lighting may be simple. Twenty-one-inch receivers are adequate in classrooms. Communication between classroom and studio varies with the ability of the instructor. It is not particularly needed with outstanding instructors. It is not practical when distribution covers more than a few classrooms. It was concluded that television instruction is feasible. Nearly any lecture or demonstration can be taught by television but television cannot substitute for practical activities of the student. Service technical schools having small sequential inputs cannot obtain sufficiently large viewing audiences to be economical. Television can be best utilized for presentation of general subjects.—*L. Twyford.*

**SHIMBERG, BENJAMIN.** ***Effectiveness of Television in Teaching Home Nursing.*** **Research Bulletin RB-54-19, Educational Testing Service, Princeton, New Jersey. August 1954. 49 p.**

*Purpose:* The purpose of this research was to evaluate the effectiveness of television in teaching the National American Red Cross Home Nursing Course. Specifically it was desired to find out whether television could be used effectively to teach home nursing to adults viewing the program at home and to discover how such instruction compared with conventional classroom instruction. In addition it was desired to obtain some indication of students' reactions to television instruction.

*Procedure:* In addition to the standard classroom group one television group took the course by television alone and a third by television with weekly practice sessions in groups. The television groups viewed 13 half-hour programs twice a week in their homes. The classroom group attended seven two-hour sessions where they received lectures, demonstrations, and supervised practice. About 400 adults were tested with written tests as well as performance tests. Differences between groups were analyzed statistically. Participants filled out questionnaires giving their reactions to the method of instruction.

*Results:* Television instruction was found to be as effective as classroom instruction in teaching facts about nursing. Students taught by television did almost as well on the performance test although they spent less time. Television instruction was found to be more efficient from the standpoint of time spent. Television instruction was very favorably received.—*L. Twyford.*

**FRANK, J. H.** *An Evaluation of Closed Circuit Television for Interceptor Pilot Training.* Final Project Report, Tyndal 53-41 Headquarters, 3626th Combat Crew Training Group, Tyndall Air Force Base, Florida. 1955. 96 p.

*Purpose:* This research was undertaken to discover whether televised weather information would be retained better under operational conditions than information obtained verbally in the usual manner. Personal weather briefings are not practical because of the distance to the base weather station and the tight training schedule that must be followed. Television was also employed to discover whether scope information showing ground controlled interceptions (GCI) has value for training on the flight line.

*Procedure:* A controlled method of experimentation in an actual training situation was used to obtain data. Identical weather information was transmitted to interceptor students by the standard verbal method over an intercommunication system and by the television method. Six sets of synthetic weather briefings, weather charts and tests were developed. Tests were administered to the students after each transmission of synthetic weather briefings. Students in three types of training were tested. Televised weather information was made available during regular flight operations in the scramble van and to aircraft controllers. Opinionnaires were used to evaluate the effectiveness of the procedures. G.C.I. remote presentations were provided on three successive days. Supervisors, instructors, and students viewed the remote presentation on a time available basis. Viewers completed a check list and filled out a questionnaire.

*Results:* Televised weather briefings were retained more advantageously than briefings received over an intercommunication system. Flight and aircraft controller personnel were favorably disposed toward weather briefing by television. With respect to televised G.C.I. information the collective opinion of interceptor flight personnel indicated that there is potential training value in a remote presentation on the flight line. The report summarizes the literature on closed circuit television and provides a bibliography of twenty items.

*—L. Twyford.*

**DOWELL, E. C.** *Closed Circuit Television Demonstration.* Training Analysis and Development Division, 3380th Technical Training Group, Keesler Air Force Base, Mississippi. December 1955. 12 p.

*Purpose:* The purpose of this demonstration was to discover worthwhile applications of closed-circuit television in technical training programs using the relatively simple industrial type television equipment.

*Procedure:* The AN/CPS-6B Radar Site was selected as the most promising possibility for use of the television equipment. One hour formal demonstrations were presented to four audiences, each of which consisted of approximately 35 observers. Video data from one or more of the 10 widely dispersed unattended cameras was presented on one or more of the receivers. The activities or views included (1) a panoramic view of the outside installation, (2) an interior view of the radome, (3) the operations building, (4) close-up view of the radome pressure gauges and indicators, (5) antenna rotation control panel, (6) demonstration of procedure for tuning for minimum discernable signal, (7) alignment of the stable local oscillator, (8) front and rear view of a vertically mounted chassis, (9) maintenance room, and (10) indicator room.

*Results:* It was found that the equipment was relatively easy to operate with a minimum of training. The simple closed circuit system was adaptable to "instructor domination" and was easily managed as a training aid without the usual complications and distractions associated with "direction" and "technical management" of formal television. Lighting was found to be important but neither complex nor expensive equipment was required. Under existing conditions it was felt that the amount of improvement in the quality of training that might be expected to result from regular use of closed circuit television would not adequately justify the cost and administrative burden of its operation. The location of television equipment with respect to radar components is given in seven figures which are included in the appendix.—*L. Twyford.*

## STILL PICTURES

**BUTTS, GORDON K.** ***An Experimental Study of the Effectiveness of Declarative, Interrogative, and Imperative Captions on Still Pictures.*** Doctor's thesis, Bloomington, Indiana: School of Education, Indiana University. 147 p. 1956. (Typewritten)

*Purpose:* To determine whether a statistically significant difference in learning occurs, with a given set of visuals, when a declarative, an imperative, or an interrogative caption is used with each visual.

*Procedure:* A set of forty-five visuals representing pictures, graphs, diagrams, etc., encountered in typical eighth-grade instructional materials was developed. By use of a rotation-type design, the participants had an opportunity to experience these visuals with declarative captions, imperative captions, and interrogative captions. Immediately after exposure, a test was given to the students to determine whether one of the caption types was statistically superior to the other types in helping students learn factual information presented on the slides. Two weeks later, a re-test was given to measure the amount of factual information retained. Data obtained from the tests were analyzed for all students as well as for upper and lower groups as indicated by IQ scores. Further analysis of test scores related to particular picture types was made.

The standard error of a difference and the t-test were used to analyze the study.

*Conclusions:* (a) Slides with declarative captions and slides with imperative captions were found to be significantly superior (at 5% level of confidence) to slides with interrogative captions in helping students learn and retain factual information presented via the slide medium. (b) No superiority was found between the declarative-caption and imperative-caption slides. (c) Conclusions (a) and (b) seem to hold true for upper and lower IQ groups as well as for the total group. (d) There seemed to be a consistency in the pattern of the declarative caption and the imperative caption being superior to the interrogative caption when the visuals were broken down by picture sets. Only one set of slides with interrogative-type captions appeared to be superior. (e) In general the "realistic" picture sets of slides produced greater learning than did the "symbolic" picture sets.—*John Moldstad.*

## FILM

**LANGE, CARL J.; RITTENHOUSE, CARL H.; and ATKINSON, RICHARD C.** *Films and Group Discussions as a Means of Training Leaders.* HumRRO Technical Report 27. Human Research Unit Nr 2, CONARC, Fort Ord, California. March 1956. 41 p.

*Purpose:* This research was conducted to develop and experimentally evaluate a course in military leadership for junior officers. Films were used to present leadership problems in a way that closely resembled real-life situations.

*Procedure:* Ten films were produced which were based on leadership problem situations encountered in a combat area. Small group discussions were used to give each student an opportunity to participate actively in solving the problems. Representatives of the small groups met in front of the class and discussed proposed solutions. An additional eight problems were presented in written form. A manual was prepared that described the discussion technique and included descriptions of the filmed problems. Three classes received regular leadership training while three other classes followed the experimental film-and-discussion instructional pattern. A questionnaire was used to obtain comments of students and instructors concerning the films, the small group discussions, and the panel discussion.

*Results:* Questionnaire comments concerning the experimental training were generally favorable. Results: 90 percent reacted favorably to the films, 87 percent to the small group discussions and 67 percent to the panel discussion. More than 80 percent reacted favorably to the entire course. Films were liked because of the realistic manner in which important details, such as attitudes and expressed feelings of characters, were shown. The small group discussions and panel discussions seemed to broaden the participants' point of view in dealing with leadership problems. Suggestions for improvement of the training included acting out solutions to problems, describing principles of leadership, including more problems, using films to present all problems and allowing opportunity for individuals to solve problems alone. Data analysis indicated that the experimental training was superior to regular training and that experimental trainees were superior to regular trainees in their ability to select good leaders.—*L. Twyford.*

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